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Volume VIII
Part 17

INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)
Volume VIII - User Interface Subsystem
Part 17 - Forms Language Compiler Product Specification

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This specification establishes the detailed design of the Forms Language Compiler (FLAN) computer program.

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FOREWORD

This technical report covers work performed under Air Force Contract F33600-87-C-0464, DAPro Project. This contract is sponsored by the Manufacturing Technology Directorate, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. It was administered under the technical direction of Mr. Bruce A. Rasmussen, Branch Chief, Integration Technology Division, Manufacturing Technology Directorate, through Mr. David L. Judson, Project Manager. The Prime Contractor was Integration Technology Services, Software Programs Division, of the Control Data Corporation, Dayton, Ohio, under the direction of Mr. W. A. Osborne. The DAPro Project Manager for Control Data Corporation was Mr. Jimmy P. Maxwell.

The DAPro project was created to continue the development, test, and demonstration of the Integrated Information Support System (IISS). The IISS technology work comprises enhancements to IISS software and the establishment and operation of IISS test bed hardware and communications for developers and users.

The following list names the Control Data Corporation subcontractors and their contributing activities:

SUBCONTRACTOR	ROLE
Control Data Corporation	Responsible for the overall Common Data Model design development and implementation, IISS integration and test, and technology transfer of IISS.
D. Appleton Company	Responsible for providing software information services for the Common Data Model and IDEF1X integration methodology.
ONTEK	Responsible for defining and testing a representative integrated system base in Artificial Intelligence techniques to establish fitness for use.
Simpact Corporation	Responsible for Communication development.
Structural Dynamics Research Corporation	Responsible for User Interfaces, Virtual Terminal Interface,and Network Transaction Manager design, development, implementation, and support.
Arizona State University	Responsible for test bed operations and support.

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SCOPE

1.1 Identification

This specification establishes the detailed design of a computer program identified as the Forms Language Compiler, hereinafter referred to as FLAN. FLAN is one configuration item of the Integrated Information Support System (IISS) User Interface (UI).

1.2 Functional Summary

FLAN is a compiler which translates Form Definition Language source files into binary Form Definition File format. The binary Form Definition Files are then used as input by the Form Processor (another configuration item of the IISS UI) for display and entry of data under the control of other application programs.

SECTION 2

DOCUMENTS

2.1 Reference Documents

[1] Structural Dynamics Research Corporation, Application Interface Product Specification, PS 620144700, 1 November 1985.

[2] Structural Dynamics Research Corporation, Forms Driven Form Editor Product Specification, PS 620144402 , 1 November 1985.

[3] Structural Dynamics Research Corporation, Form Processor Product Specification, PS 620144200, 1 November 1985.

[4] Structural Dynamics Research Corporation, Rapid Application Generator Product Specification, PS 620144502, 1 November 1985.

[5] Structural Dynamics Research Corporation, Report Writer Product Specification, PS 620144501, 1 November 1985.

[6] Structural Dynamics Research Corporation, Text Editor Product Specification, PS 620144600, 1 November 1985.

[7] Structural Dynamics Research Corporation, User Interface Services Product Specification, PS 620144100 , 1 November 1985.

[8] Structural Dynamics Research Corporation, Virtual Terminal Product Specification, PS 620144300 , 1 November 1985.

[9] Structural Dynamics Research Corporation, Forms Language Compiler Development Specification, DS 620144401B, 1 November 1985.

[10] Structural Dynamics Research Corporation, Forms Language Compiler Unit Test Plan, UTP620144401 , 1 November 1985.

[11] Structural Dynamics Research Corporation, Form Editor User Manual, UM 620144400B, 1 November 1985.

2.2 Terms and Abbreviations

Application Definition Language: an extension of the Forms Definition Language that includes retrieval of database information and conditional actions. It is used to define interactive application programs.

Attribute: field characteristic such as blinking, highlighted, black, etc. and various other combinations. Background attributes are defined for forms or windows only. Foreground attributes are defined for items. Attributes may be permanent, i.e., they remain the same unless changed by the application program, or they may be temporary, i.e., they remain in effect until the window is redisplayed.

Common Data Model: (CDM), IISS subsystem that describes common data application process formats, form definitions, etc. of the IISS and includes conceptual schema, external schemas, internal schemas, and schema transformation operators.

Display List: is similar to the open list, except that it contains only those forms that have been added to the screen and are currently displayed on the screen.

Field: two dimensional space on a terminal screen.

Form: structured view which may be imposed on windows or other forms. A form is composed of fields. These fields may be defined as forms, items, and windows.

Form Definition: (FD), forms definition language after compilation. It is read at runtime by the Form Processor.

Forms Definition Language: (FDL), the language in which electronic forms are defined.

Form Editor: (FE), subset of the IISS User Interface that is used to create definitions of forms. The FE consists of the Forms Driven Form Editor and the Forms Language Compiler.

Form Hierarchy: a graphic representation of the way in which forms, items and windows are related to their parent form.

Forms Language Compiler: (FLAN), subset of the FE that consists of a batch process that accepts a series of forms definition language statements and produces form definition files as output.

Form Processor: (FP), subset of the IISS User Interface that consists of a set of callable execution time routines available to an application program for form processing.

Integrated Information Support System: (IISS), a test computing environment used to investigate, demonstrate and test the concepts of information management and information integration in the context of Aerospace Manufacturing. The IISS addresses the problems of integration of data resident on heterogeneous data bases supported by heterogeneous computers interconnected via a Local Area Network.

Item: non-decomposable area of a form in which hard-coded descriptive text may be placed and the only defined areas where user data may be input/output.

Message: descriptive text which may be returned in the standard message line on the terminal screen. They are used to warn of errors or provide other user information.

Operating System: (OS), software supplied with a computer which allows it to supervise its own operations and manage access to hardware facilities such as memory and peripherals.

Page: instance of forms in windows that are created whenever a form is added to a window.

Paging and Scrolling: a method which allows a form to contain more data than can be displayed with provisions for viewing any portion of the data buffer.

Qualified Name: the name of a form, item or window preceded by the hierarchy path so that it is uniquely identified.

Subform: a form that is used within another form.

User Interface: (UI), IISS subsystem that controls the user's terminal and interfaces with the rest of the system. The UI consists of two major subsystems: the User Interface Development System (UIDS) and the User Interface Management System (UIMS).

User Interface Development System: (UIDS), collection of IISS User Interface subsystems that are used by applications programmers as they develop IISS applications. The UIDS includes the Form Editor and the Application Generator.

Window: dynamic area of a terminal screen on which predefined forms may be placed at run time.

SECTION 3

REQUIREMENTS

3.1 Structural Description

The detailed structure of the Forms Language Compiler is illustrated in section 3.10. The four major subsystems are:

- o Stand alone FLAN
- o Integrated FLAN
- o Reverse FLAN (REVFLAN)
- o MAKINC

3.1.1 Stand Alone FLAN

Stand alone FLAN is a batch process which resembles a normal computer language compiler in concept and use. It accepts a series of Form Definition Language statements (FDL) file) as input and produces one or more Form Processor Form Definition (fd) files as output.

FLAN is partially generated by the UNIX tool YACC. The file FLAN.Y, which contains the YACC specifications for FLAN, is the input file to YACC. YACC generates the Forms Language parser, YTAB.C.

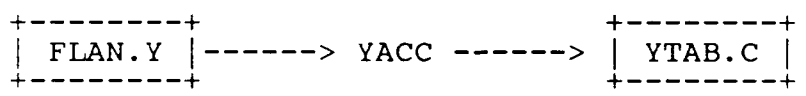


Figure 3-1 YACC Structural Description

Some support routines for the parser (FLANSP.C) were coded from scratch along with the module WRTFRM.C that writes the form definition files. Figure 3-2 describes the major module relationships for stand alone FLAN.

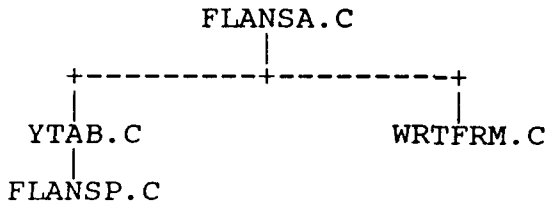


Figure 3-2 Stand Alone FLAN Module Relationships

3.1.2 Integrated FLAN

Integrated FLAN is available within the IISS environment. It makes use of the batch compiler but interfaces to the user through forms. The modules FLFRNT.C and FLUIERR.C do the interfacing with the IISS user. FLFRNT.C processes the form and FLUIERR.C performs error handling. Figure 3-3 describes the major module relationships for the integrated FLAN.

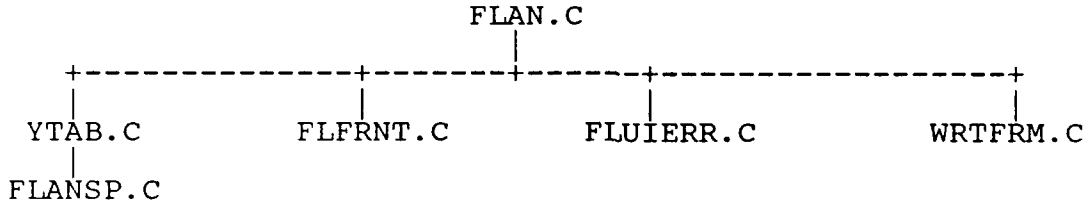


Figure 3-3 Integrated FLAN Module Relationships

3.1.3 Reverse FLAN

Reverse FLAN (REVFLAN) is a batch process that generates Form Definition Language specifications from Form Processor Form Definition (fd) files.

3.1.4 MAKINC

MAKINC is a batch process that generates a data structure corresponding to the item fields in a form and its static subforms. These data structures can be used in application programs as include files when calling the Form Processor routines GDATA and PDATA.

3.2 Functional Flow

3.2.1 Stand Alone FLAN

Figure 3-4 is a data flow diagram of Stand Alone FLAN. The Compile Language File process is almost entirely generated by YACC.

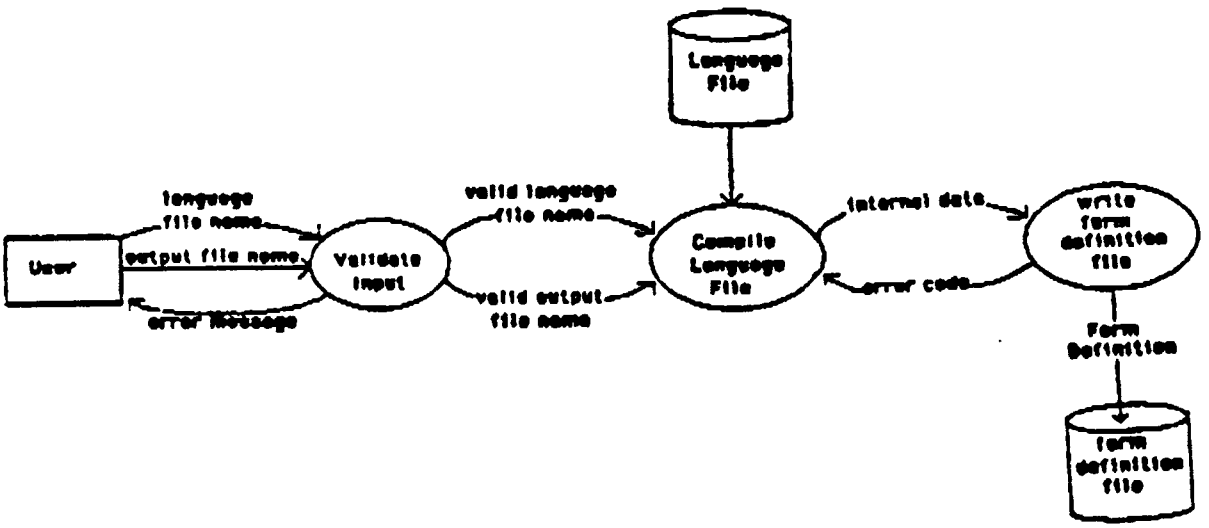


Figure 3-4 Stand Alone FLAN Data Flow

3.2.2 Integrated FLAN

Figure 3-5 is a data flow diagram of Integrated FLAN.

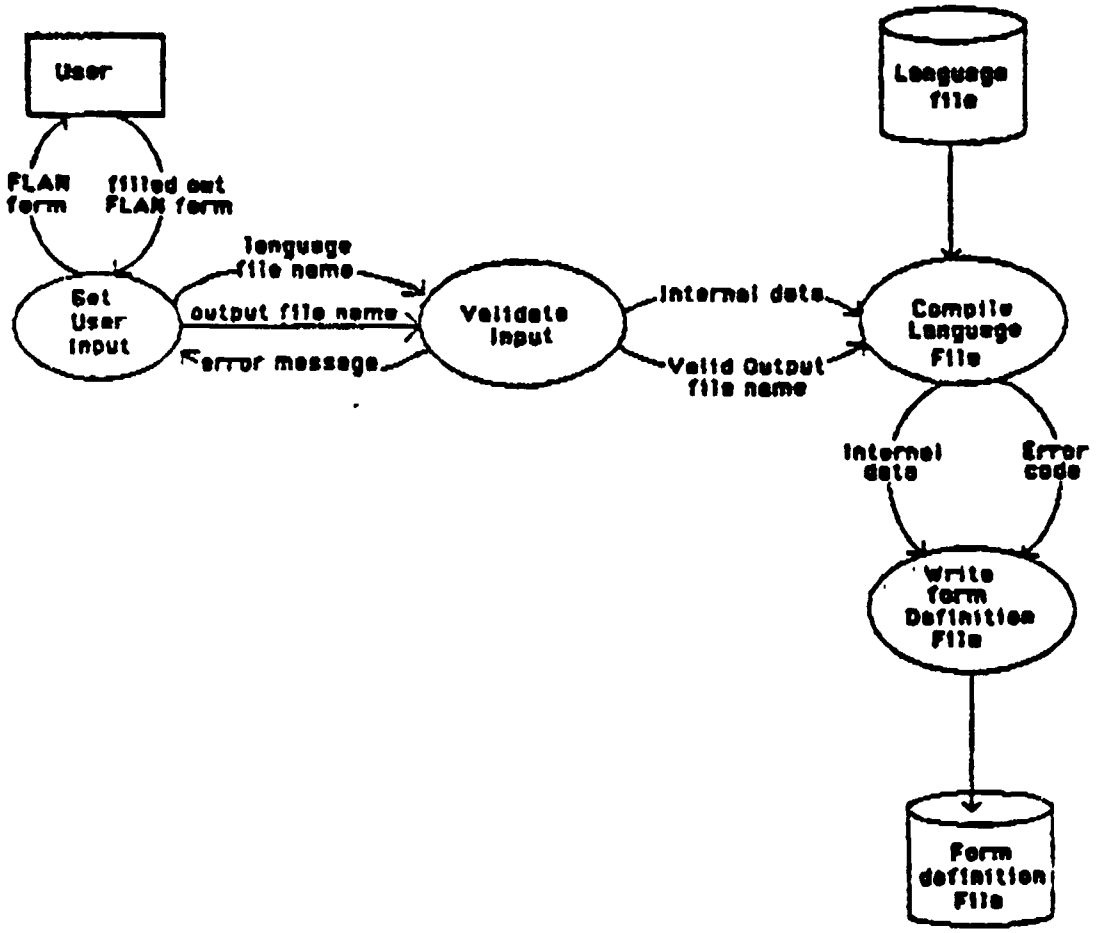


Figure 3-5 Integrated FLAN Data Flow

3.2.3 Reverse FLAN

Figure 3-6 is a data flow diagram of Reverse FLAN.

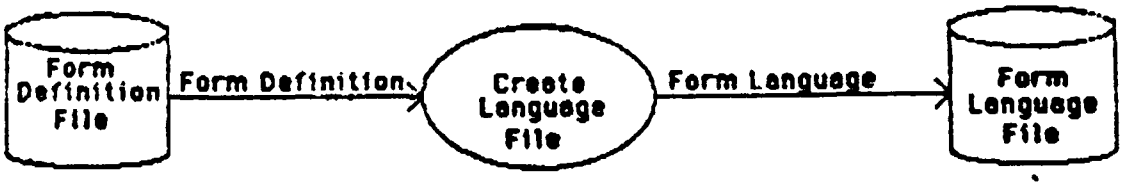


Figure 3-6 Reverse FLAN Data Flow

3.2.4 MAKINC

Figure 3-7 is a data flow diagram of MAKINC.

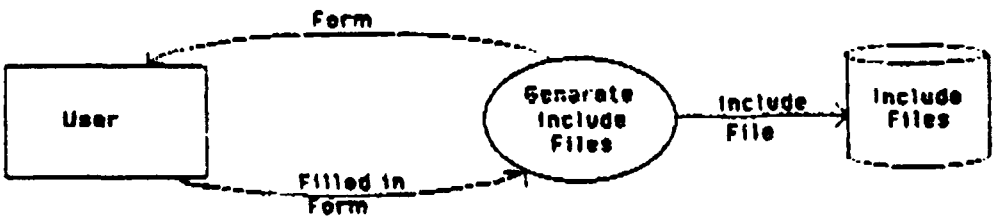


Figure 3-7 MAKINC Data Flow

3.3 Interfaces

3.3.1 Form Processor

The Form Definition files generated by FLAN are used as input to the Form Processor. The format of these files is described in section 3.7.1.1.

3.3.2 Forms Driven Form Editor

The Forms Driven Form Editor (FDFE) generates Form Definition Language (fdl) files and compiles them using code that it shares with FLAN. The FLAN modules YTAB.C, FLANSP.C, WRTFRM.C, and FLUIERR.C are used by the FDFE.

3.3.3 Report Writer

The Report Writer (RW) uses FLAN to parse its input language file and to generate its fd files. The FLAN modules YTAB.C, FLANSP.C, WRTFRM.C, and FLUIERR.C are used by the RW.

3.3.4 Rapid Application Generator

The Rapid Application Generator uses FLAN to parse its input language file and to generate its fd files. The FLAN modules YTAB.C, FLANSP.C, WRTFRM.C, and FLUIERR.C are used by the Rapid Application Generator.

3.3.5 Application Interface

Integrated FLAN is an application that uses forms to communicate with the terminal user. Integrated FLAN accomplishes this communication by calling Application Interface routines. Figure 3-8 describes this interface.

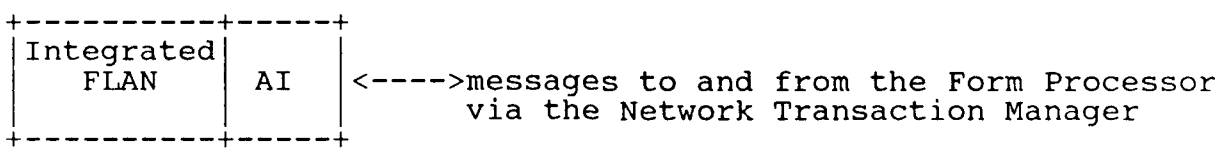


Figure 3-8 Integrated FLAN Application Interface

3.4 Program Interrupts

This section does not apply to the detailed design of the Forms Language Compiler.

3.5 Timing and Sequencing Description

The data flow diagrams in section 3.2 and the detail design description in section 3.10 contain the procedural information for sequencing and control logic.

3.6 Special Control Features

The detailed design of the Forms Language Compiler does not include any special control features as defined in the ICAM Documentation Standards manual.

3.7 Storage Allocation

The executable sizes for Stand Alone FLAN, Integrated FLAN, Reverse FLAN, and MAKINC are:

Stand Alone FLAN	138 blocks
Integrated FLAN	186 blocks
Reverse FLAN	47 blocks
MAKINC	102 blocks

3.7.1 Data Base Definition

3.7.1.1 File Descriptions

1. FILE NAME: FLAN.Y - Sequential file containing the YACC specifications for the FLAN parser.

   PURPOSE: This file is used by YACC to generate the source file YTAB.C which is the parser for FLAN.

   DECLARATION:

   ```
   char line [132];
   ```

2. FILE NAME: name.FDL - Form Definition Language file.

   PURPOSE: This file contains the language description of one or more forms. It is compiled to produce Form Definition files.

   DECLARATION:

```
char line [132];
```

3. FILE NAME: formname.FD - Form Definition file. A complete description of the Form Definition file which is a binary file is contained in Appendix B of the Forms Language Compiler Development Specification (DS 620344401). The name of this file is dependent upon the form it describes.

   PURPOSE: This file contains information about the structure and attributes of a form that is used at run time by the Form Processor.

   DECLARATION:

```
typedef struct      /* version number record */
   {
   char rectyp;     /* '1' */
   int  vernum;     /* current version number (2) */
   char linefeed;
   } VERREC;

typedef struct      /* form record */
   {
   char  form_name[10];   /* form name */
   char  background[10];  /* background name */
   short row;             /* starting row */
   short col;             /* starting col */
   short width;           /* width */
   short depth;           /* depth */
   short n_txtflds;       /* number of text fields */
   short n_datflds;       /* number of data fields */
   short s_txtbuf;        /* size of the text buffer */
   short s_defbuf;        /* size of the default buffer */
   char  linefeed;
   } FRMREC;
```

```
typedef struct      /* text record */
   {
   short row;       /* starting row */
   short col;       /* starting col */
   short len;       /* total length */
   char  linefeed;
   } TXTREC;

typedef struct      /* field record */
   {
   char  fld_name[10];   /* field name */
   char  fld_type;       /* field type (F, I, W, A) */
   short row;            /* starting row */
   short col;            /* starting col */
   short width;          /* field width */
   short depth;          /* field depth */
   int   min_value;      /* minimum value (if any) */
   int   max_value;      /* maximum value (if any) */
   char  helpline[80];   /* help text */
   char  disp_att[10];   /* display attribute */
   short n_formats;      /* number of formats */
   char  format[12][2];  /* format strings */
   short n_arydefs;      /* number of dimensions */
   struct      /* dimension specification */
      {
      char  dir;         /* repeat direction (H, V) */
      short cnt;         /* actual repeat count */
      short sp;          /* number of spaces between
                            repetitions */
      short dsp_size;    /* display repeat count */
      } array_def[3];
   char  linefeed;
   } FLDREC;

typedef struct {         /* run time relative positioning
                            info */
   POS posnod;
   NAME mynam, hnam, vnam;
   } RELREC;
```

4. FILE NAME: formname.inc - This include file is generated by MAKINC and contains the data declaration that corresponds to the form definition. Its name is dependent upon its corresponding form.

   PURPOSE: These include files are used by application programs that use the Form Processor. Generating these include files from the form definitions eliminates the need for editing the application code whenever data definitions for form variables change.

   DECLARATION: dependent on Form Definition file

3.8 Object Code Creation

The FLAN routine YTAB.C was generated by the UNIX tool YACC. It is compiled like any other C program. All other modules were compiled using a C compiler developed by Interactive Software under VAX/VMS.

3.9 Adaptation Data

The C source modules for the Forms Language Compiler can be compiled using any UNIX version 7 compatible C compiler. The YTAB.C module can be used just as any other C module, but it can only be generated with YACC.

The files FPDINI.H and GETFLS.C contain file names for the form definition and forms definition language files which may not port to systems other than VAX/VMS.

3.10 Detailed Design Description

3.10.1 Main Program List

The following is a list of all "Main Programs" which are modules that are not called by any other module being documented here. These modules are either program entry points or, if they are hooked into another set of programs via subroutine calls, they are the points the external programs can call and therefore enter through. To differentiate between the two types of entry points, look at the individual Module Documentation (section 3.10.8) and look at Module Type for each of the Main Program modules listed. Note whether the routine is a Program, Subroutine, or Function. If it is a Program, it is truly a main program entry point. If not, then it is merely called by other programs not being documented here.

FORMS LANGUAGE COMPILER Main Program List

Module Name	Purpose
FLAN/MAIN	FLAN MAIN PROGRAM
MAKINC/MAIN	MAKE INCLUDE FILES FOR FORMS
REVFLAN/MAIN	REVERSE FLAN

3.10.2 Module List

The following is a list of all the modules being documented here along with their purpose. Each module has a unique name, no matter what language it was written in.

FORMS LANGUAGE COMPILER Module List

Module Name	Purpose
ADDCHK	ADD POSITION TO CHECK LIST
CHKARY	CHECK ARRAY
CHKFLD	CHECK FIELD
CHKFRM	CHECK FORM
COBSUB	COBOL SUBROUTINE
CSTASH	CHARACTER STASH
CSUB	C SUBROUTINE
ERROR	ISSUE ERROR MESSAGE
FATAL	ISSUE FATAL ERROR MESSAGE
FLAN/MAIN	FLAN MAIN PROGRAM
FLANCI	FLAN CALLABLE INTERFACE
FLDTYP	FIELD TYPE
FNDATT	FIND ATTRIBUTE
FRNTND	FORMS FRONT END FOR FLAN
GETFILE	GET INPUT FILENAME
GFLDPT	GET FIELD POINTER
MAKACT	MAKE ACTION LIST ELEMENT
MAKINC/INDENT	INDENT OUTPUT LINE
MAKINC/MAIN	MAKE INCLUDE FILES FOR FORMS
MAKINT	MAKE EXPRESSION INTO AN INTEGER
MAKSTR	MAKE EXPRESSION INTO A STRING

FORMS LANGUAGE COMPILER Module List

Module Name	Purpose
MKPOS	MAKE POSITION NODE
MYALLOC	MY MALLOC
PLISUB	PL/I SUBROUTINE
REVFLAN/MAIN	REVERSE FLAN
WARNING	ISSUE WARNING MESSAGE
WRTEXP	WRITE EXPRESSION
WRTFRM	WRITE FORM
WRTFRM/DBFCLOS	DEFAULT BUFFER CLOSE
WRTFRM/FORMAT	INSERT FORMAT CODES
WRTFRM/TBFCLOS	TEXT BUFFER CLOSE
WRTFRM/WRTDBF	WRITE DEFAULT BUFFER
WRTFRM/WRTFLD	WRITE FIELD
WRTFRM/WRTTBF	WRITE TEXT BUFFER
WRTFRM/WRTTXT	WRITE TEXT
YYLEX	LEXICAL ANALYZER FOR FLAN
YYPARSE	FLAN PARSER

3.10.3 External Routines List

The following is a list of all routines or functions not documented here that are called by modules that are documented here. The first caller, in alphabetical order, is listed as well. See section 3.10.6 for a list of the modules that call each of these external routines.

FORMS LANGUAGE COMPILER External Routines List

Module Name	First User
ABS	CHKARY
ADDFRM	FRNTND
ATOF	YYLEX
ATOI	YYLEX
BLEN	CSUB
CALLOC	MAKINC/MAIN
CLSFRM	MAKINC/MAIN
DELFLD	FLANCI
FCLOSE	WRTFRM
FEOF	MAKINC/MAIN
FNDMSG	MAKINC/MAIN
FOPEN	MAKINC/MAIN
FPRINTF	COBSUB
FREAD	REVFLAN/MAIN
FREE	YYPARSE
FWRITE	WRTFRM/TBFCLOS
GDATA	FRNTND
GETC	REVFLAN/MAIN
GETCHAR	MAKINC/MAIN
GOFPTR	MAKINC/MAIN
INITAL	FRNTND
INITFP	FRNTND
ISALNUM	YYLEX
ISALPHA	YYLEX
ISDIGIT	YYLEX
ISSPACE	YYLEX
MAKFLD	YYPARSE
MALLOC	MYALLOC
MAX	CHKFLD
MEMCMP	FRNTND
MEMCPY	YYPARSE
MEMSET	CHKFLD
OISCR	FRNTND
OPNFRM	MAKINC/MAIN
PMSGLC	FRNTND
PMSGLS	ERROR
PRINTF	MAKINC/MAIN
PUTC	MAKINC/INDENT
SCANF	REVFLAN/MAIN
SPRINTF	FATAL
STRASN	CHKARY

FORMS LANGUAGE COMPILER External Routines List

Module Name	First User
STRCAT	YYPARSE
STRCHR	FLAN/MAIN
STRCMP	GFLDPT
STRCPY	CSUB
STRLEN	WRTFRM/WRTTXT
STRLOC	CSUB
STRNCMP	REVFLAN/MAIN
STRNCPY	WRTFRM/WRTFLD
STRUPC	YYPARSE
SYSMSG	CHKFLD
TERMFP	FLAN/MAIN
TOUPPER	YYLEX
TRMNAT	FLAN/MAIN
UNGETC	YYLEX
YYERROR	YYPARSE

3.10.4 Include File List

The following is a list of all include files called in by modules being documented here. Each include file has a unique name regardless of the language being used. The purpose of each include file is listed as well. A more complete description of each include file is given in section 3.10.9. The purpose listed is the one that is in the source code of the include file.

A purpose of "**** PURPOSE NOT FOUND BY STRIPPER ****" indicates that a purpose statement was not written into the include file itself. The most common reason for this is that the include file comes from system libraries that were not developed by the project, such as 'C' libraries that are provided with the 'C' compiler.

See section 3.10.6 for a set of lists which show all the modules which call in each of these include files.

FORMS LANGUAGE COMPILER Include File List

File Name	Purpose
CTYPE	**** PURPOSE NOT FOUND BY STRIPPER ****
FFFV2	FORM FILE FORMAT - VERSION 2
FLAN.Y"	**** PURPOSE NOT FOUND BY STRIPPER ****
FPCODE	FORM PROCESSOR RETURN CODES
FPD	FORM PROCESSOR DATA
FPDINI	FPD INITIALIZATION
FPPARM	FORM PROCESSOR PARAMETERS
MATH	**** PURPOSE NOT FOUND BY STRIPPER ****
NTM	NTM INTERFACE INCLUDE FILE
RW	REPORT WRITER DEFINITIONS
STDIO	**** PURPOSE NOT FOUND BY STRIPPER ****
STDTYP	STANDARD TYPE DEFINITIONS

3.10.5 Where Include File Used List

The following lists each include file from 3.10.4 and all the modules documented in this specification which include them. The purpose of each module is listed as well.

FORMS LANGUAGE COMPILER Where-include-file-used List

Include File	Module Name	Module Purpose
CTYPE		
	MAKACT	MAKE ACTION LIST ELEMENT
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER
FFFV2		
	WRTFRM	WRITE FORM
	WRTFRM/DB	DEFAULT BUFFER CLOSE
	WRTFRM/FO	INSERT FORMAT CODES
	WRTFRM/TB	TEXT BUFFER CLOSE
	WRTFRM/WR	WRITE DEFAULT BUFFER
	WRTFRM/WR	WRITE FIELD
	WRTFRM/WR	WRITE TEXT BUFFER
	WRTFRM/WR	WRITE TEXT
FLAN.Y"		
	MAKACT	MAKE ACTION LIST ELEMENT
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER
FPCODE		
	ADDCHK	ADD POSITION TO CHECK LIST
	CHKARY	CHECK ARRAY
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
	COBSUB	COBOL SUBROUTINE
	CSTASH	CHARACTER STASH
	CSUB	C SUBROUTINE
	FLANCI	FLAN CALLABLE INTERFACE
	FLDTYP	FIELD TYPE
	FNDATT	FIND ATTRIBUTE

FORMS LANGUAGE COMPILER Where-include-file-used List

Include File	Module Name	Module Purpose
	GFLDPT	GET FIELD POINTER
	MAKINC/IN	INDENT OUTPUT LINE
	MAKINC/MA	MAKE INCLUDE FILES FOR FORMS
	MAKINT	MAKE EXPRESSION INTO AN INTEGER
	MAKSTR	MAKE EXPRESSION INTO A STRING
	MKPOS	MAKE POSITION NODE
	MYALLOC	MY MALLOC
	PLISUB	PL/I SUBROUTINE
	WRTEXP	WRITE EXPRESSION
	WRTFRM	WRITE FORM
	WRTFRM/DB	DEFAULT BUFFER CLOSE
	WRTFRM/FO	INSERT FORMAT CODES
	WRTFRM/TB	TEXT BUFFER CLOSE
	WRTFRM/WR	WRITE DEFAULT BUFFER
	WRTFRM/WR	WRITE FIELD
	WRTFRM/WR	WRITE TEXT BUFFER
	WRTFRM/WR	WRITE TEXT
FPD		
	ADDCHK	ADD POSITION TO CHECK LIST
	CHKARY	CHECK ARRAY
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
	COBSUB	COBOL SUBROUTINE
	CSTASH	CHARACTER STASH
	CSUB	C SUBROUTINE
	FLAN/MAIN	FLAN MAIN PROGRAM
	FLANCI	FLAN CALLABLE INTERFACE
	FLDTYP	FIELD TYPE
	FNDATT	FIND ATTRIBUTE
	GETFILE	GET INPUT FILENAME
	GFLDPT	GET FIELD POINTER
	MAKACT	MAKE ACTION LIST ELEMENT
	MAKINC/IN	INDENT OUTPUT LINE
	MAKINC/MA	MAKE INCLUDE FILES FOR FORMS
	MAKINT	MAKE EXPRESSION INTO AN INTEGER
	MAKSTR	MAKE EXPRESSION INTO A STRING

FORMS LANGUAGE COMPILER Where-include-file-used List

Include File	Module Name	Module Purpose
	MKPOS	MAKE POSITION NODE
	MYALLOC	MY MALLOC
	PLISUB	PL/I SUBROUTINE
	WRTEXP	WRITE EXPRESSION
	WRTFRM	WRITE FORM
	WRTFRM/DB	DEFAULT BUFFER CLOSE
	WRTFRM/FO	INSERT FORMAT CODES
	WRTFRM/TB	TEXT BUFFER CLOSE
	WRTFRM/WR	WRITE DEFAULT BUFFER
	WRTFRM/WR	WRITE FIELD
	WRTFRM/WR	WRITE TEXT BUFFER
	WRTFRM/WR	WRITE TEXT
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER
FPDINI		
	COBSUB	COBOL SUBROUTINE
	CSUB	C SUBROUTINE
	FLAN/MAIN	FLAN MAIN PROGRAM
	GETFILE	GET INPUT FILENAME
	MAKINC/IN	INDENT OUTPUT LINE
	MAKINC/MA	MAKE INCLUDE FILES FOR FORMS
	PLISUB	PL/I SUBROUTINE
FPPARM		
	COBSUB	COBOL SUBROUTINE
	CSUB	C SUBROUTINE
	FLAN/MAIN	FLAN MAIN PROGRAM
	FRNTND	FORMS FRONT END FOR FLAN
	GETFILE	GET INPUT FILENAME
	MAKACT	MAKE ACTION LIST ELEMENT
	MAKINC/IN	INDENT OUTPUT LINE
	MAKINC/MA	MAKE INCLUDE FILES FOR FORMS
	PLISUB	PL/I SUBROUTINE

FORMS LANGUAGE COMPILER Where-include-file-used List

Include File	Module Name	Module Purpose
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER
MATH		
	MAKACT	MAKE ACTION LIST ELEMENT
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER
NTM		
	FLAN/MAIN	FLAN MAIN PROGRAM
	FRNTND	FORMS FRONT END FOR FLAN
	GETFILE	GET INPUT FILENAME
RW		
	ADDCHK	ADD POSITION TO CHECK LIST
	CHKARY	CHECK ARRAY
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
	CSTASH	CHARACTER STASH
	FLANCI	FLAN CALLABLE INTERFACE
	FLDTYP	FIELD TYPE
	FNDATT	FIND ATTRIBUTE
	GFLDPT	GET FIELD POINTER
	MAKACT	MAKE ACTION LIST ELEMENT
	MAKINT	MAKE EXPRESSION INTO AN INTEGER
	MAKSTR	MAKE EXPRESSION INTO A STRING
	MKPOS	MAKE POSITION NODE
	MYALLOC	MY MALLOC
	WRTEXP	WRITE EXPRESSION
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER

FORMS LANGUAGE COMPILER Where-include-file-used List

Include File	Module Name	Module Purpose
STDIO		
	ADDCHK	ADD POSITION TO CHECK LIST
	CHKARY	CHECK ARRAY
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
	COBSUB	COBOL SUBROUTINE
	CSTASH	CHARACTER STASH
	CSUB	C SUBROUTINE
	FLAN/MAIN	FLAN MAIN PROGRAM
	FLANCI	FLAN CALLABLE INTERFACE
	FLDTYP	FIELD TYPE
	FNDATT	FIND ATTRIBUTE
	GETFILE	GET INPUT FILENAME
	GFLDPT	GET FIELD POINTER
	MAKACT	MAKE ACTION LIST ELEMENT
	MAKINC/IN	INDENT OUTPUT LINE
	MAKINC/MA	MAKE INCLUDE FILES FOR FORMS
	MAKINT	MAKE EXPRESSION INTO AN INTEGER
	MAKSTR	MAKE EXPRESSION INTO A STRING
	MKPOS	MAKE POSITION NODE
	MYALLOC	MY MALLOC
	PLISUB	PL/I SUBROUTINE
	REVFLAN/M	REVERSE FLAN
	WRTEXP	WRITE EXPRESSION
	WRTFRM	WRITE FORM
	WRTFRM/DB	DEFAULT BUFFER CLOSE
	WRTFRM/FO	INSERT FORMAT CODES
	WRTFRM/TB	TEXT BUFFER CLOSE
	WRTFRM/WR	WRITE DEFAULT BUFFER
	WRTFRM/WR	WRITE FIELD
	WRTFRM/WR	WRITE TEXT BUFFER
	WRTFRM/WR	WRITE TEXT
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER

FORMS LANGUAGE COMPILER Where-include-file-used List

Include File	Module Name	Module Purpose
STDTYP		
	ADDCHK	ADD POSITION TO CHECK LIST
	CHKARY	CHECK ARRAY
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
	COBSUB	COBOL SUBROUTINE
	CSTASH	CHARACTER STASH
	CSUB	C SUBROUTINE
	ERROR	ISSUE ERROR MESSAGE
	FATAL	ISSUE FATAL ERROR MESSAGE
	FLAN/MAIN	FLAN MAIN PROGRAM
	FLANCI	FLAN CALLABLE INTERFACE
	FLDTYP	FIELD TYPE
	FNDATT	FIND ATTRIBUTE
	FRNTND	FORMS FRONT END FOR FLAN
	GETFILE	GET INPUT FILENAME
	GFLDPT	GET FIELD POINTER
	MAKACT	MAKE ACTION LIST ELEMENT
	MAKINC/IN	INDENT OUTPUT LINE
	MAKINC/MA	MAKE INCLUDE FILES FOR FORMS
	MAKINT	MAKE EXPRESSION INTO AN INTEGER
	MAKSTR	MAKE EXPRESSION INTO A STRING
	MKPOS	MAKE POSITION NODE
	MYALLOC	MY MALLOC
	PLISUB	PL/I SUBROUTINE
	REVFLAN/M	REVERSE FLAN
	WARNING	ISSUE WARNING MESSAGE
	WRTEXP	WRITE EXPRESSION
	WRTFRM	WRITE FORM
	WRTFRM/DB	DEFAULT BUFFER CLOSE
	WRTFRM/FO	INSERT FORMAT CODES
	WRTFRM/TB	TEXT BUFFER CLOSE
	WRTFRM/WR	WRITE DEFAULT BUFFER
	WRTFRM/WR	WRITE FIELD
	WRTFRM/WR	WRITE TEXT BUFFER
	WRTFRM/WR	WRITE TEXT

FORMS LANGUAGE COMPILER Where-include-file-used List

Include File	Module Name	Module Purpose
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER

3.10.6 Where External Routine Used List

The following lists each external function or routine listed in 3.10.3 and all the documented modules which call it. The purpose of each module is listed as well.

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
ABS		
	CHKARY	CHECK ARRAY
	CHKFRM	CHECK FORM
	CHKFRM	CHECK FORM
ADDFRM		
	FRNTND	FORMS FRONT END FOR FLAN
ATOF		
	YYLEX	LEXICAL ANALYZER FOR FLAN
ATOI		
	YYLEX	LEXICAL ANALYZER FOR FLAN
BLEN		
	CHKFLD	CHECK FIELD
	COBSUB	COBOL SUBROUTINE
	CSUB	C SUBROUTINE
	PLISUB	PL/I SUBROUTINE
CALLOC		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
CLSFRM		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
DELFLD		
	FLANCI	FLAN CALLABLE INTERFACE
FCLOSE		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
	REVFLAN/MAREVERSE	FLAN
	WRTFRM	WRITE FORM
FEOF		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
FNDMSG		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
FOPEN		
	GETFILE	GET INPUT FILENAME
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
	REVFLAN/MAREVERSE	FLAN
	WRTFRM	WRITE FORM
FPRINTF		
	COBSUB	COBOL SUBROUTINE
	CSUB	C SUBROUTINE
	PLISUB	PL/I SUBROUTINE
	REVFLAN/MAREVERSE	FLAN
FREAD		
	REVFLAN/MAREVERSE	FLAN

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
FREE		
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
	WRTEXP	WRITE EXPRESSION
	YYPARSE	FLAN PARSER
FWRITE		
	WRTFRM	WRITE FORM
	WRTFRM/DBF	DEFAULT BUFFER CLOSE
	WRTFRM/TBF	TEXT BUFFER CLOSE
	WRTFRM/WRTWRITE	DEFAULT BUFFER
	WRTFRM/WRTWRITE	FIELD
	WRTFRM/WRTWRITE	TEXT BUFFER
	WRTFRM/WRTWRITE	TEXT
GDATA		
	FRNTND	FORMS FRONT END FOR FLAN
GETC		
	REVFLAN/MA	REVERSE FLAN
	YYLEX	LEXICAL ANALYZER FOR FLAN
GETCHAR		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
GOFPTR		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
INITAL	FRNTND	FORMS FRONT END FOR FLAN
INITFP	FRNTND	FORMS FRONT END FOR FLAN
ISALNUM	YYLEX	LEXICAL ANALYZER FOR FLAN
ISALPHA	YYLEX	LEXICAL ANALYZER FOR FLAN
ISDIGIT	YYLEX	LEXICAL ANALYZER FOR FLAN
ISSPACE	YYLEX	LEXICAL ANALYZER FOR FLAN
MAKFLD	YYPARSE	FLAN PARSER
MALLOC	CSUB	C SUBROUTINE

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
	MYALLOC	MY MALLOC
	REVFLAN/MA	REVERSE FLAN
MAX		
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
MEMCMP		
	FRNTND	FORMS FRONT END FOR FLAN
MEMCPY		
	CHKFLD	CHECK FIELD
	WRTEXP	WRITE EXPRESSION
	WRTFRM/WRT	WRITE FIELD
	YYPARSE	FLAN PARSER
MEMSET		
	CHKFLD	CHECK FIELD
OISCR		
	FLAN/MAIN	FLAN MAIN PROGRAM
	FRNTND	FORMS FRONT END FOR FLAN
OPNFRM		
	MAKINC/MAI	MAKE INCLUDE FILES FOR FORMS

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
PMSGLC		
	FRNTND	FORMS FRONT END FOR FLAN
PMSGLS		
	ERROR	ISSUE ERROR MESSAGE
	FATAL	ISSUE FATAL ERROR MESSAGE
	WARNING	ISSUE WARNING MESSAGE
PRINTF		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
	REVFLAN/MAREVERSE	FLAN
	YYPARSE	FLAN PARSER
PUTC		
	MAKINC/INDINDENT	OUTPUT LINE
	PLISUB	PL/I SUBROUTINE
	REVFLAN/MAREVERSE	FLAN
SCANF		
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
	REVFLAN/MAREVERSE	FLAN
SPRINTF		
	ERROR	ISSUE ERROR MESSAGE
	FATAL	ISSUE FATAL ERROR MESSAGE
	FRNTND	FORMS FRONT END FOR FLAN
	GETFILE	GET INPUT FILENAME
	MAKINC/MAIMAKE	INCLUDE FILES FOR FORMS
	REVFLAN/MAREVERSE	FLAN
	WARNING	ISSUE WARNING MESSAGE

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
	WRTEXP	WRITE EXPRESSION
	WRTFRM	WRITE FORM
	YYPARSE	FLAN PARSER
STRASN		
	CHKARY	CHECK ARRAY
	CHKFRM	CHECK FORM
	WRTFRM	WRITE FORM
STRCAT		
	YYPARSE	FLAN PARSER
STRCHR		
	FLAN/MAIN	FLAN MAIN PROGRAM
	FRNTND	FORMS FRONT END FOR FLAN
	YYPARSE	FLAN PARSER
STRCMP		
	FNDATT	FIND ATTRIBUTE
	GFLDPT	GET FIELD POINTER
	YYLEX	LEXICAL ANALYZER FOR FLAN
	YYPARSE	FLAN PARSER
STRCPY		
	CSTASH	CHARACTER STASH
	CSUB	C SUBROUTINE
	WRTFRM	WRITE FORM
	WRTFRM/WRT	WRITE FIELD
	YYPARSE	FLAN PARSER

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
STRLEN		
	CHKFLD	CHECK FIELD
	CHKFRM	CHECK FORM
	CSTASH	CHARACTER STASH
	ERROR	ISSUE ERROR MESSAGE
	FATAL	ISSUE FATAL ERROR MESSAGE
	REVFLAN/MA	REVERSE FLAN
	WARNING	ISSUE WARNING MESSAGE
	WRTEXP	WRITE EXPRESSION
	WRTFRM	WRITE FORM
	WRTFRM/WRT	WRITE TEXT
	YYPARSE	FLAN PARSER
STRLOC		
	CSUB	C SUBROUTINE
STRNCMP		
	MAKINC/MAI	MAKE INCLUDE FILES FOR FORMS
	REVFLAN/MA	REVERSE FLAN
STRNCPY		
	WRTFRM/WRT	WRITE FIELD
	YYPARSE	FLAN PARSER
STRUPC		
	MAKINC/MAI	MAKE INCLUDE FILES FOR FORMS
	YYPARSE	FLAN PARSER

FORMS LANGUAGE COMPILER Where-external-routine-used List

System Module	Module Name	Module Purpose
SYSMSG		
	CHKFLD	CHECK FIELD
	WRTFRM	WRITE FORM
TERMFP		
	FLAN/MAIN	FLAN MAIN PROGRAM
TOUPPER		
	YYLEX	LEXICAL ANALYZER FOR FLAN
TRMNAT		
	FLAN/MAIN	FLAN MAIN PROGRAM
	FRNTND	FORMS FRONT END FOR FLAN
UNGETC		
	YYLEX	LEXICAL ANALYZER FOR FLAN
YYERROR		
	YYPARSE	FLAN PARSER

3.10.7 Main Program Parts List

The following lists each Main Program listed in 3.10.1 and all the modules which are called either by that module itself or by any of the documented modules which it calls. It is possible for a non-main module to be listed more that once if it is called by multiple modules. The called modules, in this case known as program parts, are marked as to whether they are documented here. If so, the phrase "well-defined module" appears by the module name, if not it is an "external "routine". The Purpose of the Main Program module is listed as well.

FORMS LANGUAGE COMPILER Main Program Parts List

Main Pgm Name	Module Name	Module Type
FLAN/MAIN	Purpose-->	FLAN MAIN PROGRAM
	ABS	External routine
	ADDCHK	Well-defined module
	ADDFRM	External routine
	ATOF	External routine
	ATOI	External routine
	BLEN	External routine
	CHKARY	Well-defined module
	CHKFLD	Well-defined module
	CHKFRM	Well-defined module
	CSTASH	Well-defined module
	DELFLD	External routine
	ERROR	Well-defined module
	FATAL	Well-defined module
	FCLOSE	External routine
	FLANCI	Well-defined module
	FLDTYP	Well-defined module
	FNDATT	Well-defined module
	FOPEN	External routine
	FREE	External routine
	FRNTND	Well-defined module
	FWRITE	External routine
	GDATA	External routine
	GETC	External routine
	GETFILE	Well-defined module
	GFLDPT	Well-defined module
	INITAL	External routine
	INITFP	External routine
	ISALNUM	External routine
	ISALPHA	External routine
	ISDIGIT	External routine
	ISSPACE	External routine
	MAKACT	Well-defined module
	MAKFLD	External routine
	MAKINT	Well-defined module
	MAKSTR	Well-defined module
	MALLOC	External routine
	MAX	External routine
	MEMCMP	External routine
	MEMCPY	External routine

FORMS LANGUAGE COMPILER Main Program Parts List

Main Pgm Name	Module Name	Module Type
	MEMSET	External routine
	MKPOS	Well-defined module
	MYALLOC	Well-defined module
	OISCR	External routine
	PMSGLC	External routine
	PMSGLS	External routine
	PRINTF	External routine
	SPRINTF	External routine
	STRASN	External routine
	STRCAT	External routine
	STRCHR	External routine
	STRCMP	External routine
	STRCPY	External routine
	STRLEN	External routine
	STRNCPY	External routine
	STRUPC	External routine
	SYSMSG	External routine
	TERMFP	External routine
	TOUPPER	External routine
	TRMNAT	External routine
	UNGETC	External routine
	WARNING	Well-defined module
	WRTEXP	Well-defined module
	WRTFRM	Well-defined module
	WRTFRM/DBFCLOS	Well-defined module
	WRTFRM/FORMAT	Well-defined module
	WRTFRM/TBFCLOS	Well-defined module
	WRTFRM/WRTDBF	Well-defined module
	WRTFRM/WRTFLD	Well-defined module
	WRTFRM/WRTTBF	Well-defined module
	WRTFRM/WRTTXT	Well-defined module
	YYERROR	External routine
	YYLEX	Well-defined module
	YYPARSE	Well-defined module

FORMS LANGUAGE COMPILER Main Program Parts List

Main Pgm Name	Module Name	Module Type
MAKINC/MAIN	Purpose-->	MAKE INCLUDE FILES FOR FORMS
	BLEN	External routine
	CALLOC	External routine
	CLSFRM	External routine
	COBSUB	Well-defined module
	CSUB	Well-defined module
	FCLOSE	External routine
	FEOF	External routine
	FNDMSG	External routine
	FOPEN	External routine
	FPRINTF	External routine
	GETCHAR	External routine
	GOFPTR	External routine
	MAKINC/INDENT	Well-defined module
	MALLOC	External routine
	OPNFRM	External routine
	PLISUB	Well-defined module
	PRINTF	External routine
	PUTC	External routine
	SCANF	External routine
	SPRINTF	External routine
	STRCPY	External routine
	STRLOC	External routine
	STRNCMP	External routine
	STRUPC	External routine

FORMS LANGUAGE COMPILER Main Program Parts List

Main Pgm Name	Module Name	Module Type
REVFLAN/MAIN	Purpose-->	REVERSE FLAN
	FCLOSE	External routine
	FOPEN	External routine
	FPRINTF	External routine
	FREAD	External routine
	GETC	External routine
	MALLOC	External routine
	PRINTF	External routine
	PUTC	External routine
	SCANF	External routine
	SPRINTF	External routine
	STRLEN	External routine
	STRNCMP	External routine

3.10.8 Module Documentation

The following documentation describes information which is specific to each individual module being documented in this specification as listed in section 3.10.2. It provides a compact way of getting information that would be otherwise buried within each module's source code.

The specific items in this module documentation have the following meanings:

NAME:	Name of program Module.
PURPOSE:	Purpose of Module as detailed in the source code.
LANGUAGE:	Programming language source code is written in. The choices are: VAX-11 FORTRAN C (I/S-1 Workbench 'C') VAX-11 COBOL
MODULE TYPE:	Whether a Program, Subroutine, or Function.
SOURCE FILE:	Name of Source File from file specification.
SOURCE FILE TYPE:	Source File Extension from file specification.
HOST:	Whether this is a host-dependent routine (VAX or IBM) or blank if host-independent.
SUBSYSTEM:	IISS sub-system this file resides in.
SUBDIRECTORY:	Sub-directory of that subsystem in which this file resides.
DOCUMENTATION GROUP:	Name of documentation group of which this source file is a member.
DESCRIPTION:	A description of the module as otained from the source code.
ARGUMENTS:	The arguments with which this routine is called if it is a Subroutine or a Function.
INCLUDE FILES:	A list of all the files that are included into this module as well as their purposes.

ROUTINES CALLED:	Subroutines or Functions, either documented or external, called by this module, if any.
CALLED DIRECTLY BY:	The documented routines which call this module, if any.
USED IN MAIN PROGRAM(S):	The documented Main Programs which contain this module in their parts list according to the list in section 3.10.7.

The Module Documentation is arranged alphabetically according to Module Name.

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   ADDCHK
PURPOSE:                ADD POSITION TO CHECK LIST
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     VOID ADDCHK(POSPTR)
        POS *POSPTR;

  DESCRIPTION
     ADDS THE SPECIFIED POSITION TO THE OVERLAP CHECK LIST
```

ARGUMENTS:

POSPTR = POS *

INCLUDE FILES:

STDTYP - STANDARD TYPE DEFINITIONS
STDIO - **** PURPOSE NOT FOUND BY STRIPPER ****
FPD - FORM PROCESSOR DATA
RW - REPORT WRITER DEFINITIONS
FPCODE - FORM PROCESSOR RETURN CODES

ROUTINES CALLED:

FLDTYP - FIELD TYPE
ERROR - ISSUE ERROR MESSAGE

CALLED DIRECTLY BY:

CHKFRM - CHECK FORM

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

NAME: CHKARY
PURPOSE: CHECK ARRAY
LANGUAGE: C
MODULE TYPE: FUNCTION
FUNCTION TYPE: CHAR * ()
SOURCE FILE: FLANSP
SOURCE FILE TYPE: .C
HOST:
SUBSYSTEM: UI
SUBDIRECTORY: FE
DOCUMENTATION GROUP: FDFE/FLAN

DESCRIPTION:

SYNOPSIS

```
VOID CHKARY(ARYPTR)
   FIELD *ARYPTR;
```

DESCRIPTION

GENERATES POSITIONS FOR EACH ELEMENT OF AN ARRAY FOR OVERLAP CHECKING

ARGUMENTS:

ARYPTR = FIELD *

INCLUDE FILES:

STDTYP	- STANDARD TYPE DEFINITIONS
STDIO	- **** PURPOSE NOT FOUND BY STRIPPER ****
FPD	- FORM PROCESSOR DATA
RW	- REPORT WRITER DEFINITIONS
FPCODE	- FORM PROCESSOR RETURN CODES

ROUTINES CALLED:

MYALLOC	- MY MALLOC
ABS	
STRASN	

CALLED DIRECTLY BY:

CHKFRM	- CHECK FORM

USED IN MAIN PROGRAM(S):

FLAN/MAIN	- FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   CHKFLD
PURPOSE:                CHECK FIELD
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     VOID CHKFLD()

  DESCRIPTION
     CHECKS THE CURRENT FIELD FOR COMPLETENESS AND CONSISTENCY


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  FNDATT      - FIND ATTRIBUTE
  ERROR       - ISSUE ERROR MESSAGE
  MEMSET
  MAX
  FREE
  WRTEXP      - WRITE EXPRESSION
  BLEN
  MEMCPY
  SYSMSG
  MYALLOC     - MY MALLOC
  STRLEN


CALLED DIRECTLY BY:
-------------------
  YYPARSE     - FLAN PARSER


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   CHKFRM
PURPOSE:                CHECK FORM
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     VOID CHKFRM()

  DESCRIPTION
     CHECKS THE CURRENT FORM FOR COMPLETENESS AND CONSISTENCY


INCLUDE FILES:
--------------
  STDTYP        - STANDARD TYPE DEFINITIONS
  STDIO         - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD           - FORM PROCESSOR DATA
  RW            - REPORT WRITER DEFINITIONS
  FPCODE        - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  WARNING       - ISSUE WARNING MESSAGE
  ADDCHK        - ADD POSITION TO CHECK LIST
  CHKARY        - CHECK ARRAY
  ABS
  STRLEN
  FREE
  FLDTYP        - FIELD TYPE
  ERROR         - ISSUE ERROR MESSAGE
  GFLDPT        - GET FIELD POINTER
  ABS
  MAX
  STRASN
  FNDATT        - FIND ATTRIBUTE


CALLED DIRECTLY BY:
-------------------
  YYPARSE       - FLAN PARSER
```

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   COBSUB
PURPOSE:                COBOL SUBROUTINE
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            MAKINC
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FLAN

DESCRIPTION:
------------

ARGUMENTS:
----------
  DP =        FIELD *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPDINI      - FPD INITIALIZATION
  FPPARM      - FORM PROCESSOR PARAMETERS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  COBSUB      - COBOL SUBROUTINE
  BLEN
  FPRINTF
  MAKINC/INDENT - INDENT OUTPUT LINE


CALLED DIRECTLY BY:
-------------------
  COBSUB      - COBOL SUBROUTINE
  MAKINC/MAI - MAKE INCLUDE FILES FOR FORMS


USED IN MAIN PROGRAM(S):
------------------------
  MAKINC/MAI - MAKE INCLUDE FILES FOR FORMS
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   CSTASH
PURPOSE:                CHARACTER STASH
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     CHAR *CSTASH(S)
        CHAR *S;

  DESCRIPTION
     SAVES THE SPECIFIED CHARACTER STRING AND RETURNS A
                     POINTER TO IT

ARGUMENTS:
----------
  S =        CHAR *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  STRCPY
  STRLEN
  MYALLOC     - MY MALLOC


CALLED DIRECTLY BY:
-------------------
  YYLEX       - LEXICAL ANALYZER FOR FLAN
  YYPARSE     - FLAN PARSER


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

NAME: CSUB
PURPOSE: C SUBROUTINE
LANGUAGE: C
MODULE TYPE: SUBROUTINE
FUNCTION TYPE: VOID ()
SOURCE FILE: MAKINC
SOURCE FILE TYPE: .C
HOST:
SUBSYSTEM: UI
SUBDIRECTORY: FE
DOCUMENTATION GROUP: FLAN

DESCRIPTION:

ARGUMENTS:

DP = FIELD *

INCLUDE FILES:

STDTYP	- STANDARD TYPE DEFINITIONS
STDIO	- **** PURPOSE NOT FOUND BY STRIPPER ****
FPD	- FORM PROCESSOR DATA
FPDINI	- FPD INITIALIZATION
FPPARM	- FORM PROCESSOR PARAMETERS
FPCODE	- FORM PROCESSOR RETURN CODES

ROUTINES CALLED:

CSUB	- C SUBROUTINE
BLEN	
MAKINC/INDENT	- INDENT OUTPUT LINE
FPRINTF	
STRLOC	
STRCPY	
MALLOC	

CALLED DIRECTLY BY:

CSUB	- C SUBROUTINE
MAKINC/MAI	- MAKE INCLUDE FILES FOR FORMS

USED IN MAIN PROGRAM(S):

MAKINC/MAI - MAKE INCLUDE FILES FOR FORMS

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   ERROR
PURPOSE:                ISSUE ERROR MESSAGE
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            FLUIERR
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     VOID ERROR(S, A, B, C, D, E, F)
        CHAR *S, *A, *B, *C, *D, *E, *F;

  DESCRIPTION
     PRINTS AN ERROR MESSAGE ON STDERR AND INCREMENTS THE
                        NUMBER OF ERRORS

ARGUMENTS:
----------
  S =         CHAR *
  A =         CHAR *
  B =         CHAR *
  C =         CHAR *
  D =         CHAR *
  E =         CHAR *
  F =         CHAR *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS


ROUTINES CALLED:
----------------
  PMSGLS
  STRLEN
  SPRINTF


CALLED DIRECTLY BY:
-------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
  GETFILE     - GET INPUT FILENAME
  CHKFLD      - CHECK FIELD
  CHKFRM      - CHECK FORM
```

ADDCHK - ADD POSITION TO CHECK LIST
YYLEX - LEXICAL ANALYZER FOR FLAN
YYPARSE - FLAN PARSER

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   FATAL
PURPOSE:                ISSUE FATAL ERROR MESSAGE
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            FLUIERR
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     VOID FATAL(S, A, B, C, D, E, F)
        CHAR *S, *A, *B, *C, *D, *E, *F;

  DESCRIPTION
     PRINTS A FATAL MESSAGE ON STDERR AND EXITS

ARGUMENTS:
----------
  S =         CHAR *
  A =         CHAR *
  B =         CHAR *
  C =         CHAR *
  D =         CHAR *
  E =         CHAR *
  F =         CHAR *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS


ROUTINES CALLED:
----------------
  SPRINTF
  STRLEN
  PMSGLS


CALLED DIRECTLY BY:
-------------------
  MYALLOC     - MY MALLOC
  YYLEX       - LEXICAL ANALYZER FOR FLAN
  YYPARSE     - FLAN PARSER
```

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   FLAN/MAIN
PURPOSE:                FLAN MAIN PROGRAM
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          INT ()
SOURCE FILE:            FLAN
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FLAN
DOCUMENTATION GROUP:    FLAN

DESCRIPTION:
------------
  SYNOPSIS
     MAIN(ARGC, ARGV)
        INT ARGC;
        CHAR *ARGV[];

  DESCRIPTION
     MAIN PROGRAM.  PROMPTS FOR FILE NAME IF NOT GIVEN, CALLS
                    PARSER, CALLS
     WRITEOUT IF NO ERRORS.

ARGUMENTS:
----------
  ARGC =        INT
  ARGV =        CHAR * []


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPDINI      - FPD INITIALIZATION
  NTM         - NTM INTERFACE INCLUDE FILE
  FPPARM      - FORM PROCESSOR PARAMETERS


ROUTINES CALLED:
----------------
  STRCHR
  GETFILE     - GET INPUT FILENAME
  FLANCI      - FLAN CALLABLE INTERFACE
  WRTFRM      - WRITE FORM
  ERROR       - ISSUE ERROR MESSAGE
  OISCR
  TERMFP
  TRMNAT
  FRNTND      - FORMS FRONT END FOR FLAN
```

FORMS LANGUAGE COMPILER Module Documentation

NAME: FLANCI
PURPOSE: FLAN CALLABLE INTERFACE
LANGUAGE: C
MODULE TYPE: FUNCTION
FUNCTION TYPE: CHAR * ()
SOURCE FILE: FLANSP
SOURCE FILE TYPE: .C
HOST:
SUBSYSTEM: UI
SUBDIRECTORY: FE
DOCUMENTATION GROUP: FDFE/FLAN

DESCRIPTION:

SYNOPSIS

```
CHAR *FLANCI(FPTR)
   FILE *FPTR;
```

INPUTS:
FPTR - FILE TO BE COMPILED

DESCRIPTION
COMPILES THE SPECIFIED FILE INTO THE LOCAL OPEN LIST.

ARGUMENTS:

FPTR = FILE *

INCLUDE FILES:

STDTYP	- STANDARD TYPE DEFINITIONS
STDIO	- **** PURPOSE NOT FOUND BY STRIPPER ****
FPD	- FORM PROCESSOR DATA
RW	- REPORT WRITER DEFINITIONS
FPCODE	- FORM PROCESSOR RETURN CODES

ROUTINES CALLED:

YYPARSE	- FLAN PARSER
DELFLD	

CALLED DIRECTLY BY:

FLAN/MAIN	- FLAN MAIN PROGRAM

USED IN MAIN PROGRAM(S):

FLAN/MAIN	- FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   FLDTYP
PURPOSE:                FIELD TYPE
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
    CHAR *FLDTYP(C)
       CHAR C;

  DESCRIPTION
    RETURNS A STRING OF THE SPECIFIED FIELD TYPE

ARGUMENTS:
----------
  C =        CHAR


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


CALLED DIRECTLY BY:
-------------------
  CHKFRM      - CHECK FORM
  ADDCHK      - ADD POSITION TO CHECK LIST


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   FNDATT
PURPOSE:                FIND ATTRIBUTE
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          ATTMAP * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     ATTMAP     *FNDATT(S)
        CHAR *S;

  DESCRIPTION
     RETURNS A POINTER TO THE SPECIFIED ATTRIBUTE IN THE
                     ATTRIBUTE MAP

ARGUMENTS:
----------
  S =         CHAR *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  STRCMP


CALLED DIRECTLY BY:
-------------------
  CHKFLD      - CHECK FIELD
  CHKFRM      - CHECK FORM
  YYPARSE     - FLAN PARSER


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   FRNTND
PURPOSE:                FORMS FRONT END FOR FLAN
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            FLFRNT
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FLAN
DOCUMENTATION GROUP:    FLAN

DESCRIPTION:
------------

  SYNOPSIS
     CHAR *FLFRNT()


     INPUTS/OUTPUTS:
        NONE

     INPUTS:
        NONE

     OUTPUTS:
        NONE

  DESCRIPTION
        THIS FUNCTION PRESENTS A TOP LEVEL FORM REQUESTING A
                      FILE NAME FROM
     THE USER.  IT RETURNS THAT FILE NAME TO GRP.  THE NAME OF
                      THE FORM IS
     "APFRONT.FDL" FOR THE APPLICATION GENERATOR AND
                      "RWFRONT.FDL" FOR THE
     REPORT WRITER AND "FLFRONT.FDL" FOR FLAN.  IT IS
                      HARDCODED INTO THE
     ROUTINE.  THERE IS ONE COPY OF THIS ROUTINE FOR THE AP
                      AND ONE FOR
     THE RW AND ONE FOR FLAN.

ARGUMENTS:
----------
  FILNAM =        CHAR [41]


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  FPPARM      - FORM PROCESSOR PARAMETERS
  NTM         - NTM INTERFACE INCLUDE FILE
```

ROUTINES CALLED:

STRCHR
INITAL
MEMCMP
TRMNAT
PMSGLC
INITFP
ADDFRM
GDATA
OISCR
SPRINTF

CALLED DIRECTLY BY:

FLAN/MAIN - FLAN MAIN PROGRAM

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   GETFILE
PURPOSE:                GET INPUT FILENAME
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          FILE * ()
SOURCE FILE:            FLAN
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FLAN
DOCUMENTATION GROUP:    FLAN

DESCRIPTION:
------------

ARGUMENTS:
----------
  ARGC =        INT
  NAMPTR =        CHAR *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPDINI      - FPD INITIALIZATION
  NTM         - NTM INTERFACE INCLUDE FILE
  FPPARM      - FORM PROCESSOR PARAMETERS


ROUTINES CALLED:
----------------
  SPRINTF
  FOPEN
  ERROR       - ISSUE ERROR MESSAGE


CALLED DIRECTLY BY:
-------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   GFLDPT
PURPOSE:                GET FIELD POINTER
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          FIELD * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     FIELD *GFLDPT(FLDPTR, S)
        FIELD *FLDPTR;
        CHAR  *S;

  DESCRIPTION
     RETURN A POINTER TO THE NAMED FIELD ON THE SPECIFIED FORM.

ARGUMENTS:
----------
  FLDPTR =        FIELD *
  S =         CHAR *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  STRCMP


CALLED DIRECTLY BY:
-------------------
  CHKFRM      - CHECK FORM
  YYPARSE     - FLAN PARSER


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   MAKACT
PURPOSE:                MAKE ACTION LIST ELEMENT
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            YTAB
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
    VOID MAKACT(TYPE)
       CHAR TYPE;

  DESCRIPTION
     MAKES AN ACTLST NODE, PUTS IN VALUES AND ADDS IT TO THE
                        LIST

ARGUMENTS:
----------
  TYPE =        CHAR


INCLUDE FILES:
--------------
  FLAN.Y"     - **** PURPOSE NOT FOUND BY STRIPPER ****
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  CTYPE       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPPARM      - FORM PROCESSOR PARAMETERS
  RW          - REPORT WRITER DEFINITIONS
  MATH        - **** PURPOSE NOT FOUND BY STRIPPER ****


ROUTINES CALLED:
----------------
  MYALLOC     - MY MALLOC


CALLED DIRECTLY BY:
-------------------
  YYPARSE     - FLAN PARSER


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

NAME: MAKINC/INDENT
PURPOSE: INDENT OUTPUT LINE
LANGUAGE: C
MODULE TYPE: SUBROUTINE
FUNCTION TYPE: VOID ()
SOURCE FILE: MAKINC
SOURCE FILE TYPE: .C
HOST:
SUBSYSTEM: UI
SUBDIRECTORY: FE
DOCUMENTATION GROUP: FLAN

DESCRIPTION:

ARGUMENTS:

M =	INT
T =	INT

INCLUDE FILES:

STDTYP	- STANDARD TYPE DEFINITIONS
STDIO	- **** PURPOSE NOT FOUND BY STRIPPER ****
FPD	- FORM PROCESSOR DATA
FPDINI	- FPD INITIALIZATION
FPPARM	- FORM PROCESSOR PARAMETERS
FPCODE	- FORM PROCESSOR RETURN CODES

ROUTINES CALLED:

PUTC

CALLED DIRECTLY BY:

CSUB	- C SUBROUTINE
COBSUB	- COBOL SUBROUTINE
PLISUB	- PL/I SUBROUTINE

USED IN MAIN PROGRAM(S):

MAKINC/MAI - MAKE INCLUDE FILES FOR FORMS

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   MAKINC/MAIN
PURPOSE:                MAKE INCLUDE FILES FOR FORMS
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            MAKINC
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FLAN
```

DESCRIPTION:

SYNOPSIS
MAIN()

DESCRIPTION
CREATES AN INCLUDE FILE IN THE CURRENT DIRECTORY FOR THE GIVEN FORMS.

INCLUDE FILES:

STDTYP	- STANDARD TYPE DEFINITIONS
STDIO	- **** PURPOSE NOT FOUND BY STRIPPER ****
FPD	- FORM PROCESSOR DATA
FPDINI	- FPD INITIALIZATION
FPPARM	- FORM PROCESSOR PARAMETERS
FPCODE	- FORM PROCESSOR RETURN CODES

ROUTINES CALLED:

CALLOC	
PRINTF	
GOFPTR	
CLSFRM	
FCLOSE	
CSUB	- C SUBROUTINE
COBSUB	- COBOL SUBROUTINE
PLISUB	- PL/I SUBROUTINE
SPRINTF	
FOPEN	
STRUPC	
OPNFRM	
STRNCMP	
FNDMSG	
GETCHAR	
FEOF	
SCANF	

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   MAKINT
PURPOSE:                MAKE EXPRESSION INTO AN INTEGER
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          ENODE * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     ENODE *MAKINT(EP)
        ENODE *EP;

  DESCRIPTION
     CONVERT THE SPECIFIED EXPRESSION TO INTEGER AND RETURN
                        POINTER TO NEW
     EXPRESSION.

ARGUMENTS:
----------
  EP =        ENODE *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  MYALLOC     - MY MALLOC


CALLED DIRECTLY BY:
-------------------
  YYPARSE     - FLAN PARSER


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   MAKSTR
PURPOSE:                MAKE EXPRESSION INTO A STRING
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          ENODE * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     ENODE *MAKSTR(EP)
        ENODE *EP;

  DESCRIPTION
     CONVERT THE SPECIFIED EXPRESSION TO STRING AND RETURN
                     POINTER TO NEW
     EXPRESSION.

ARGUMENTS:
----------
  EP =        ENODE *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  MYALLOC     - MY MALLOC


CALLED DIRECTLY BY:
-------------------
  YYPARSE     - FLAN PARSER


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   MKPOS
PURPOSE:                MAKE POSITION NODE
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          POS * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     POS *MKPOS(HPOS, HMIN, HLOC, HREF, VPOS, VMIN, VLOC, VREF)
        INT HPOS, HMIN, HLOC;
        CHAR *HREF;
        INT VPOS, VMIN, VLOC;
        CHAR *VREF;

  DESCRIPTION
     CREATES THE SPECIFIED POSITION NODE AND ADDS IT TO THE
                        LIST.  HPOS AND
     VPOS ARE THE REFERENCE POINTS ON THE CURRENT FIELD, HMIN
                        AND VMIN ARE THE
     LOCATION RELATIVE TO THE REFERENCE FIELD, HLOC AND VLOC
                        ARE THE REFERENCE
     POINTS ON THE REFERENCE FIELD, AND HREF AND VREF ARE THE
                        REFERENCE
     FIELDS.

ARGUMENTS:
----------
  HPOS =        INT
  HMIN =        INT
  HLOC =        INT
  HREF =        CHAR *
  VPOS =        INT
  VMIN =        INT
  VLOC =        INT
  VREF =        CHAR *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES
```

ROUTINES CALLED:

MYALLOC - MY MALLOC

CALLED DIRECTLY BY:

YYPARSE - FLAN PARSER

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   MYALLOC
PURPOSE:                MY MALLOC
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     CHAR *MYALLOC(SIZE)
        UNSIGNED SIZE;

  DESCRIPTION
     ALLOCATE THE SPECIFIED MEMORY IF POSSIBLE, ELSE ISSUE
                        FATAL ERROR

ARGUMENTS:
----------
  SIZE =        UNSIGNED


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  RW          - REPORT WRITER DEFINITIONS
  FPCODE      - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  FATAL       - ISSUE FATAL ERROR MESSAGE
  MALLOC


CALLED DIRECTLY BY:
-------------------
  CHKFLD      - CHECK FIELD
  CHKARY      - CHECK ARRAY
  CSTASH      - CHARACTER STASH
  WRTEXP      - WRITE EXPRESSION
  MKPOS       - MAKE POSITION NODE
  MAKINT      - MAKE EXPRESSION INTO AN INTEGER
  MAKSTR      - MAKE EXPRESSION INTO A STRING
  MAKACT      - MAKE ACTION LIST ELEMENT
  YYPARSE     - FLAN PARSER
```

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

NAME: PLISUB
PURPOSE: PL/I SUBROUTINE
LANGUAGE: C
MODULE TYPE: SUBROUTINE
FUNCTION TYPE: VOID ()
SOURCE FILE: MAKINC
SOURCE FILE TYPE: .C
HOST:
SUBSYSTEM: UI
SUBDIRECTORY: FE
DOCUMENTATION GROUP: FLAN

DESCRIPTION:

ARGUMENTS:

DP = FIELD *

INCLUDE FILES:

STDTYP	- STANDARD TYPE DEFINITIONS
STDIO	- **** PURPOSE NOT FOUND BY STRIPPER ****
FPD	- FORM PROCESSOR DATA
FPDINI	- FPD INITIALIZATION
FPPARM	- FORM PROCESSOR PARAMETERS
FPCODE	- FORM PROCESSOR RETURN CODES

ROUTINES CALLED:

PLISUB	- PL/I SUBROUTINE
BLEN	
PUTC	
MAKINC/INDENT	- INDENT OUTPUT LINE
FPRINTF	

CALLED DIRECTLY BY:

PLISUB	- PL/I SUBROUTINE
MAKINC/MAI	- MAKE INCLUDE FILES FOR FORMS

USED IN MAIN PROGRAM(S):

MAKINC/MAI - MAKE INCLUDE FILES FOR FORMS

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   REVFLAN/MAIN
PURPOSE:                REVERSE FLAN
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          INT ()
SOURCE FILE:            REVFLAN
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FLAN
DOCUMENTATION GROUP:    FLAN

DESCRIPTION:
------------

  SYNOPSIS
     FDREAD()


   INPUTS/OUTPUTS:


   INPUTS:
          A FORMS FILE WITH THE .FD EXTENSION.

      OUTPUTS:
          A FORMATTED DUMP OF THE FILE.


  DESCRIPTION
     REVERSE COMPILES A .FD FILE TO PROVIDE THE SOURCE FOR A
                      FORM.
     THE PROGRAM PROMPTS FOR THE OUTPUT FILE NAME THEN
                      REPEATEDLY
     ASKS FOR FORMS FROM THE IISSFLIB DIRECTORY. A 'Z
                      TERMINATES
     THE LIST.


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****


ROUTINES CALLED:
----------------
  PRINTF
  FPRINTF
  FCLOSE
  GETC
  PUTC
  MALLOC
```

FREAD
SCANF
STRLEN
STRNCMP
SPRINTF
FOPEN

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WARNING
PURPOSE:                ISSUE WARNING MESSAGE
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            FLUIERR
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN
```

DESCRIPTION:

SYNOPSIS

```
VOID WARNING(S, A, B, C, D, E, F)
   CHAR *S, *A, *B, *C, *D, *E, *F;
```

DESCRIPTION

PRINTS A WARNING MESSAGE ON STDERR

ARGUMENTS:

```
S =         CHAR *
A =         CHAR *
B =         CHAR *
C =         CHAR *
D =         CHAR *
E =         CHAR *
F =         CHAR *
```

INCLUDE FILES:

```
STDTYP      - STANDARD TYPE DEFINITIONS
```

ROUTINES CALLED:

```
PMSGLS
STRLEN
SPRINTF
```

CALLED DIRECTLY BY:

```
CHKFRM      - CHECK FORM
YYLEX       - LEXICAL ANALYZER FOR FLAN
YYPARSE     - FLAN PARSER
```

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTEXP
PURPOSE:                WRITE EXPRESSION
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            FLANSP
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     CHAR *WRTEXP(EP)
        ENODE *EP;

     INPUTS:
        EP - EXPRESSION TO WRITE

     OUTPUTS:
        RETURNS A POINTER TO THE WRITTEN EXPRESSION OR NULL
                     FOR ERRORS

  DESCRIPTION
     RETURNS A POINTER TO THE CHARACTER STRING REPRESENTING
                     THE GIVEN
     EXPRESSION, OR NULL IF AN ERROR IS DETECTED.

ARGUMENTS:
----------
  EP =          ENODE *

INCLUDE FILES:
--------------
  STDTYP        - STANDARD TYPE DEFINITIONS
  STDIO         - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD           - FORM PROCESSOR DATA
  RW            - REPORT WRITER DEFINITIONS
  FPCODE        - FORM PROCESSOR RETURN CODES


ROUTINES CALLED:
----------------
  FREE
  WRTEXP        - WRITE EXPRESSION
  MEMCPY
  MYALLOC       - MY MALLOC
  STRLEN
  SPRINTF
```

CALLED DIRECTLY BY:

CHKFLD	- CHECK FIELD
WRTEXP	- WRITE EXPRESSION

USED IN MAIN PROGRAM(S):

FLAN/MAIN	- FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM
PURPOSE:                WRITE FORM
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          CHAR * ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------

  SYNOPSIS
     CHAR *WRTFRM(FP)
        FIELD *FP;

     INPUTS:
        FP - POINTER TO FORM TO WRITE OUT

  DESCRIPTION
     WRITES THE SPECIFIED FORM INTO A .FD FILE.

ARGUMENTS:
----------
  OPNPTR =        FIELD *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


ROUTINES CALLED:
----------------
  SPRINTF
  FOPEN
  SYSMSG
  FWRITE
  FCLOSE
  WRTFRM/WRTTXT - WRITE TEXT
  WRTFRM/WRTFLD - WRITE FIELD
  WRTFRM/WRTTBF - WRITE TEXT BUFFER
  WRTFRM/TBFCLOS - TEXT BUFFER CLOSE
  WRTFRM/WRTDBF - WRITE DEFAULT BUFFER
  WRTFRM/DBFCLOS - DEFAULT BUFFER CLOSE
```

STRASN
STRCPY
STRLEN

CALLED DIRECTLY BY:

FLAN/MAIN - FLAN MAIN PROGRAM

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM/DBFCLOS
PURPOSE:                DEFAULT BUFFER CLOSE
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     DBFCLOS(FPTR, I, LINE)
        FILE  *FPTR;
        INT   I;
        CHAR  LINE[81];

  DESCRIPTION
     WRITES THE LAST LINE OF THE DEFAULT LINE BUFFER.

ARGUMENTS:
----------
  FPTR =        FILE *
  I =         INT
  LINE =        CHAR [81]


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


ROUTINES CALLED:
----------------
  FWRITE


CALLED DIRECTLY BY:
-------------------
  WRTFRM      - WRITE FORM


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM/FORMAT
PURPOSE:                INS . F FORMAT CODES
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYP. :      .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     FORMAT(FLDREC, FMT1, FMT2)
        FLDREC   *FLDREC;
        CHAR   FMT1, FMT2;

  DESCRIPTION
     INSERTS THE SPECIFIED FORMAT INTO THE SPECIFIED FIELD
                     RECORD.

ARGUMENTS:
----------
  FLDREC =        FLDREC *
  FMT1 =        CHAR
  FMT2 =        CHAR


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


CALLED DIRECTLY BY:
-------------------
  WRTFRM/WRTFLD - WRITE FIELD


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN  - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM/TBFCLOS
PURPOSE:                TEXT BUFFER CLOSE
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     TBFCLOS(FPTR, I, LINE)
        FILE   *FPTR;
        INT    I;
        CHAR   LINE[];

  DESCRIPTION
     WRITES THE LAST LINE OF THE TEXT LINE BUFFER.

ARGUMENTS:
----------
  FPTR =        FILE *
  I =         INT
  LINE =        CHAR []


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


ROUTINES CALLED:
----------------
  FWRITE


CALLED DIRECTLY BY:
-------------------
  WRTFRM      - WRITE FORM


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM/WRTDBF
PURPOSE:                WRITE DEFAULT BUFFER
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          INT ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     INT WRTDBF(FPTR, FLDPTR, I, LINE)
        FILE  *FPTR;
        FIELD *FLDPTR;
        INT   I;
        CHAR  LINE[81];

  DESCRIPTION
     COPIES THE SPECIFIED FIELD DEFAULT VALUE INTO THE DEFAULT
                    VALUE LINE
     BUFFER STARTING AT THE SPECIFIED POSITION AND WRITING THE
                    LINE BUFFER
     WHEN FULL.  RETURNS THE NEXT POSITION TO USE.

ARGUMENTS:
----------
  FPTR =        FILE *
  FLDPTR =        FIELD *
  I =        INT
  LINE =        CHAR [81]


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


ROUTINES CALLED:
----------------
  FWRITE


CALLED DIRECTLY BY:
-------------------
  WRTFRM      - WRITE FORM
```

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM/WRTFLD
PURPOSE:                WRITE FIELD
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     WRTFLD(FPTR, FLDPTR)
        FILE    *FPTR;
        FIELD    *FLDPTR;

  DESCRIPTION
     WRITES THE FIELD RECORD FOR THE SPECIFIED FIELD STRUCTURE.

ARGUMENTS:
----------
  FPTR =        FILE *
  FLDPTR =        FIELD *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


ROUTINES CALLED:
----------------
  FWRITE
  STRCPY
  WRTFRM/FORMAT - INSERT FORMAT CODES
  STRNCPY
  MEMCPY


CALLED DIRECTLY BY:
-------------------
  WRTFRM      - WRITE FORM
```

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM/WRTTBF
PURPOSE:                WRITE TEXT BUFFER
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          INT ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     INT WRTTBF(FPTR, TXTPTR, I, LINE)
        FILE   *FPTR;
        TEXT   *TXTPTR;
        CHAR   LINE[81];
        INT    I;

  DESCRIPTION
     COPIES THE SPECIFIED TEXT INTO THE TEXT LINE BUFFER
                     STARTING AT THE
     SPECIFIED POSITION AND WRITING THE LINE BUFFER WHEN FULL.
                      RETURNS THE
     NEXT POSITION TO USE.

ARGUMENTS:
----------
  FPTR =        FILE *
  TXTPTR =        TEXT *
  I =        INT
  LINE =        CHAR [81]


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


ROUTINES CALLED:
----------------
  FWRITE


CALLED DIRECTLY BY:
-------------------
  WRTFRM      - WRITE FORM
```

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   WRTFRM/WRTTXT
PURPOSE:                WRITE TEXT
LANGUAGE:               C
MODULE TYPE:            SUBROUTINE
FUNCTION TYPE:          VOID ()
SOURCE FILE:            WRTFRM
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FP
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     WRTTXT(FPTR, TXTPTR)
        FILE    *FPTR;
        TEXT    *TXTPTR;

  DESCRIPTION
     WRITES THE TEXT RECORD FOR THE SPECIFIED TEXT STRUCTURE.

ARGUMENTS:
----------
  FPTR =        FILE *
  TXTPTR =        TEXT *


INCLUDE FILES:
--------------
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPCODE      - FORM PROCESSOR RETURN CODES
  FFFV2       - FORM FILE FORMAT - VERSION 2


ROUTINES CALLED:
----------------
  FWRITE
  STRLEN


CALLED DIRECTLY BY:
-------------------
  WRTFRM      - WRITE FORM


USED IN MAIN PROGRAM(S):
------------------------
  FLAN/MAIN   - FLAN MAIN PROGRAM
```

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   YYLEX
PURPOSE:                LEXICAL ANALYZER FOR FLAN
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          INT ()
SOURCE FILE:            YTAB
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN

DESCRIPTION:
------------
  SYNOPSIS
     INT LEX()

     OUTPUTS:
        SETS YYLVAL TO THE TOKEN VALUE (IF ANY)
        RETURN THE TOKEN TYPE

  DESCRIPTION
     RECOGNIZES TOKENS (KEYWORDS, IDENTIFIERS, NUMBERS, ETC.),
                        SETS YYLVAL,
     AND RETURNS THE APPROPRIATE TOKEN TYPE.


INCLUDE FILES:
--------------
  FLAN.Y"      - **** PURPOSE NOT FOUND BY STRIPPER ****
  STDTYP       - STANDARD TYPE DEFINITIONS
  STDIO        - **** PURPOSE NOT FOUND BY STRIPPER ****
  CTYPE        - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD          - FORM PROCESSOR DATA
  FPPARM       - FORM PROCESSOR PARAMETERS
  RW           - REPORT WRITER DEFINITIONS
  MATH         - **** PURPOSE NOT FOUND BY STRIPPER ****


ROUTINES CALLED:
----------------
  GETC
  ERROR        - ISSUE ERROR MESSAGE
  ISALNUM
  ISDIGIT
  FATAL        - ISSUE FATAL ERROR MESSAGE
  UNGETC
  WARNING      - ISSUE WARNING MESSAGE
  STRCMP
  CSTASH       - CHARACTER STASH
  ATOF
  ISALPHA
```

TOUPPER
ATOI
ISSPACE

CALLED DIRECTLY BY:

YYPARSE - FLAN PARSER

USED IN MAIN PROGRAM(S):

FLAN/MAIN - FLAN MAIN PROGRAM

FORMS LANGUAGE COMPILER Module Documentation

```
NAME:                   YYPARSE
PURPOSE:                FLAN PARSER
LANGUAGE:               C
MODULE TYPE:            FUNCTION
FUNCTION TYPE:          INT ()
SOURCE FILE:            YTAB
SOURCE FILE TYPE:       .C
HOST:
SUBSYSTEM:              UI
SUBDIRECTORY:           FE
DOCUMENTATION GROUP:    FDFE/FLAN
```

DESCRIPTION:

```
  DESCRIPTION
     DEFINITION LANGUAGE GRAMMAR.
```

INCLUDE FILES:

```
  FLAN.Y"     - **** PURPOSE NOT FOUND BY STRIPPER ****
  STDTYP      - STANDARD TYPE DEFINITIONS
  STDIO       - **** PURPOSE NOT FOUND BY STRIPPER ****
  CTYPE       - **** PURPOSE NOT FOUND BY STRIPPER ****
  FPD         - FORM PROCESSOR DATA
  FPPARM      - FORM PROCESSOR PARAMETERS
  RW          - REPORT WRITER DEFINITIONS
  MATH        - **** PURPOSE NOT FOUND BY STRIPPER ****
```

ROUTINES CALLED:

```
  PRINTF
  STRUPC
  STRNCPY
  FREE
  STRCAT
  MYALLOC     - MY MALLOC
  MEMCPY
  MAKACT      - MAKE ACTION LIST ELEMENT
  MAKINT      - MAKE EXPRESSION INTO AN INTEGER
  STRCMP
  STRLEN
  WARNING     - ISSUE WARNING MESSAGE
  SPRINTF
  MKPOS       - MAKE POSITION NODE
  FATAL       - ISSUE FATAL ERROR MESSAGE
  STRCPY
  CHKFLD      - CHECK FIELD
  CHKFRM      - CHECK FORM
  STRCHR
  ERROR       - ISSUE ERROR MESSAGE
```

MAKSTR	- MAKE EXPRESSION INTO A STRING
CSTASH	- CHARACTER STASH
GFLDPT	- GET FIELD POINTER
MAKFLD	
FNDATT	- FIND ATTRIBUTE
YYERROR	
YYLEX	- LEXICAL ANALYZER FOR FLAN

CALLED DIRECTLY BY:

FLANCI	- FLAN CALLABLE INTERFACE

USED IN MAIN PROGRAM(S):

FLAN/MAIN	- FLAN MAIN PROGRAM

3.10.9 Include File Descriptions

The following list contains a purpose and description of each include file listed in 3.10.4 as specified in the source code. The language it is written in is also given.

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: FFFV2
PURPOSE: FORM FILE FORMAT - VERSION 2
LANGUAGE: C

DESCRIPTION:

DESCRIPTION
RECORD LAYOUTS FOR THE BINARY FORM DEFINITION FILE

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: FLAN
PURPOSE: FLAN INTERNAL STRUCTURES
LANGUAGE: C

DESCRIPTION:

DESCRIPTION
AUXILIARY DATA STRUCTURES USED BY FLAN.

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: FPCODE
PURPOSE: FORM PROCESSOR RETURN CODES
LANGUAGE: C

DESCRIPTION:

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: FPD
PURPOSE: FORM PROCESSOR DATA
LANGUAGE: C

DESCRIPTION:

DESCRIPTION
DATA DEFINITIONS FOR ALL FORM PROCESSOR (INCLUDING MONITER)DATA.

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: FPDINI
PURPOSE: FPD INITIALIZATION
LANGUAGE: C

DESCRIPTION:

DESCRIPTION
INITIALIZED VERSION OF UID FOR INCLUSION IN MAIN PROGRAM.

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: FPPARM
PURPOSE: FORM PROCESSOR PARAMETERS
LANGUAGE: C

DESCRIPTION:

DESCRIPTION: THESE DATA DEFINITIONS ARE USED
IN THE FORM PROCESSOR ROUTINES.

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: NTM
PURPOSE: NTM INTERFACE INCLUDE FILE
LANGUAGE: C

DESCRIPTION:

DESCRIPTION
INCLUDE FILE FOR NTM INTERFACE

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: RW
PURPOSE: REPORT WRITER DEFINITIONS
LANGUAGE: C

DESCRIPTION:

DESCRIPTION

FORMS LANGUAGE COMPILER Include File Description

FILE NAME: STDTYP
PURPOSE: STANDARD TYPE DEFINITIONS
LANGUAGE: C

DESCRIPTION:

DESCRIPTION
THIS FILE ENSURES THAT THE FOLLOWING STANDARD TYPES ARE AVAILABLE:

FLOAT	- SINGLE PRECISION FLOAT
DOUBLE	- DOUBLE PRECISION FLOAT
LONG	- 32 BIT (OR LARGER) SIGNED INTEGER
LBITS	- 32 BITS (OR MORE) FOR BIT MANIPULATION
INT	- NATURAL SIZE SIGNED INTEGER
UNSIGNED	- NATURAL SIZE UNSIGNED INTEGER
BOOL	- NATURAL SIZE LOGICAL (ZERO / NON-ZERO ONLY)
SHORT	- 16 BIT (OR LARGER) SIGNED INTEGER
USHORT	- 16 BIT (OR LARGER) UNSIGNED INTEGER
BITS	- 16 BITS (OR MORE) FOR BIT MANIPULATION
CHAR	- SINGLE MACHINE CHARACTER (REAL CHARACTERS ALWAYS POSITIVE)
TINY	- 8 BIT (OR LARGER) SIGNED INTEGER
UTINY	- 8 BIT (OR LARGER) UNSIGNED INTEGER
TBITS	- 8 BITS (OR MORE) FOR BIT MANIPULATION
TBOOL	- 8 BIT (OR LARGER) LOGICAL (ZERO / NON-ZERO ONLY)
METACHAR	- 16 BIT (OR LARGER) AUGMENTED CHARACTER (SIGNED)
VOID	- FUNCTION THAT RETURNS NO VALUE
FORTRAN	- STORAGE CLASS FOR FOREIGN (NON-C) ROUTINES OR C ROUTINES WHICH ARE CALLABLE FROM FOREIGN ROUTINES

SINCE NOT ALL COMPILERS SUPPORT USHORT, TINY, AND UTINY, THE FUNCTIONS USHORT(), TINY(), AND UTINY() SHOULD BE USED WHENEVER REFERENCING THEM.

IN ADDITION, THE FOLLOWING UTILITY MACROS ARE DEFINED:

LURSHIFT(N, B)	- UNSIGNED LONG RIGHT SHIFT
MAX(A, B)	- MAXIMUM OF A AND B
MIN(A, B)	- MINIMUM OF A AND B

FORMS LANGUAGE COMPILER Include File Description

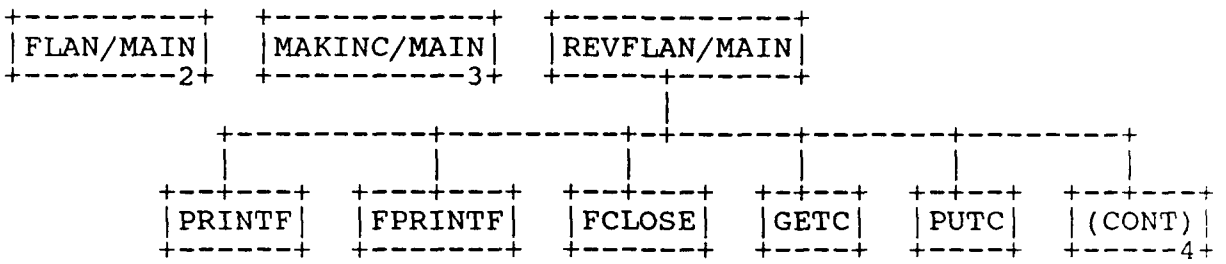
```
ABS(A)          - ABSOLUTE VALUE OF A
STRASN(A, B)    - TRANSPORTABLE A = B FOR STRUCTURES
NULL            - NULL POINTER VALUE (0)
TRUE            - 1
FALSE           - 0
SUCCESS         - EXIT(SUCCESS) INDICATES SUCCESSFUL
                  COMPLETION
FAILURE         - EXIT(FAILURE) INDICATES ERRORS

THE FOLLOWING SYMBOLS SHOULD BE DEFINED BASED ON THE
                  COMPILER BEING USED:
USHORT  - COMPILER SUPPORTS UNSIGNED SHORT
TINY    - COMPILER TREATS CHAR AS SIGNED
UTINY   - CHAR IS SIGNED AND COMPILER SUPPORTS
             UNSIGNED CHAR
VOID    - COMPILER SUPPORTS VOID
FORTRAN - COMPILER SUPPORTS FORTRAN
STRASN  - DEFINE APPROPRIATE MACRO
SUCCESS - DEFINE APPROPRIATE VALUE IF NOT 0
FAILURE - DEFINE APPROPRIATE VALUE IF NOT 1
```

3.10.10 Hierarchy Chart

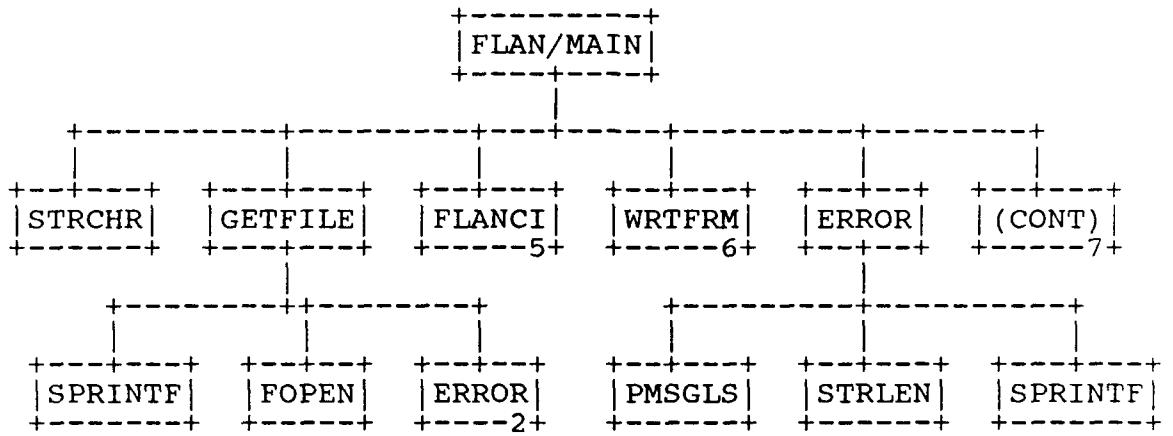
The following hierarchy charts show the relationships between all of the modules mentioned in the above documentation. A module may call a subroutine several times within its code, but the call will only be shown once as a single relationship on this hierarchy chart. All modules shown at the top of the first page are considered Main Programs as described in section 3.10.1 above.

There is an internal paging scheme as marked by the numbers in the upper right corner of each page. An index after the last page of the chart shows where a routine and its calls are first defined. If a routine has no page reference, it either makes no calls or is an external routine. A continuation box on the end of a tree limb shows where that the tree continues on the page numbered mentioned. A number in a box with a routine name points to the page where the routine is further defined within the hierarchy tree. If there is no number in a box, the routine either makes no calls or is an external routine.

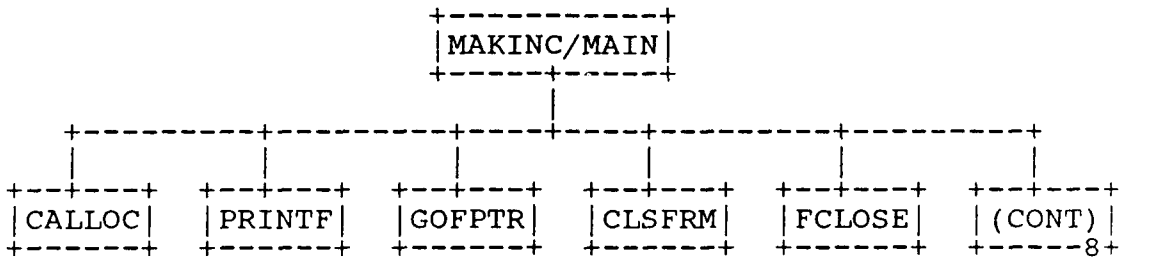
1


FLAN/MAIN
2
MAKINC/MAIN
3
REVFLAN/MAIN
PRINTF
FPRINTF
FCLOSE
GETC
PUTC
(CONT)
4

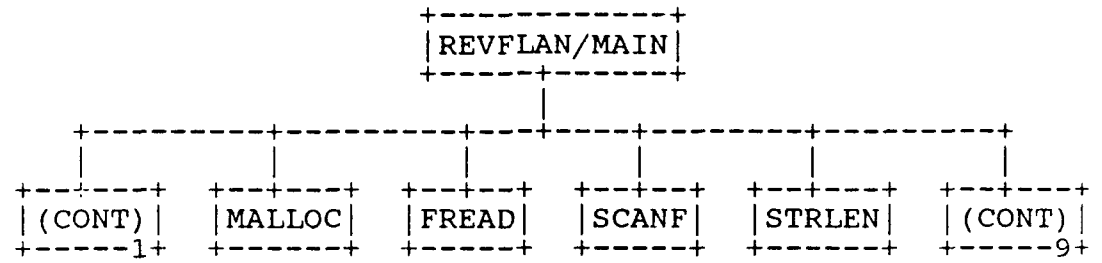
2


FLAN/MAIN
STRCHR
GETFILE
FLANCI
5
WRTFRM
6
ERROR
(CONT)
7
SPRINTF
FOPEN
ERROR
2
PMSGLS
STRLEN
SPRINTF

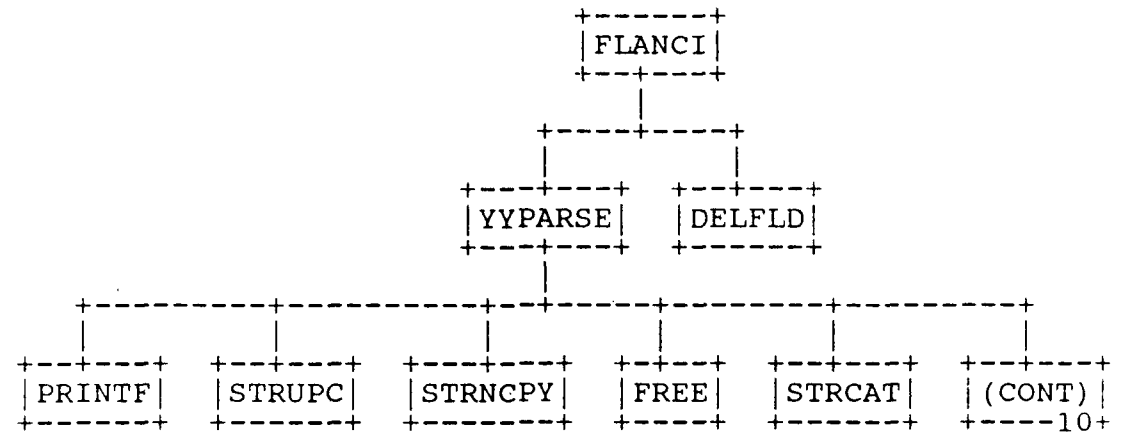
3


MAKINC/MAIN
CALLOC
PRINTF
GOFPTR
CLSFRM
FCLOSE
(CONT)
8

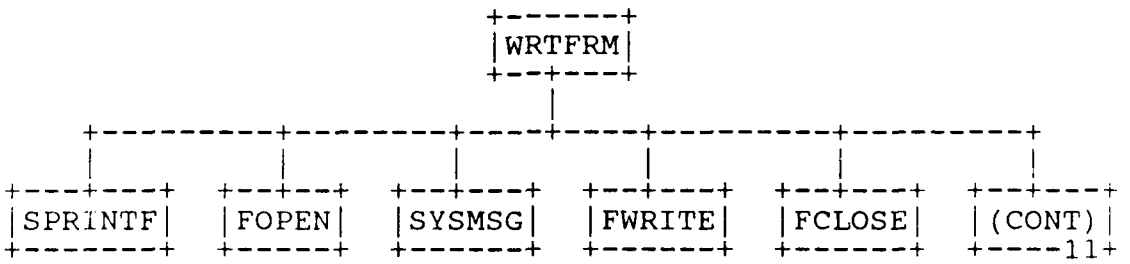
4


REVFLAN/MAIN
(CONT)
1
MALLOC
FREAD
SCANF
STRLEN
(CONT)
9

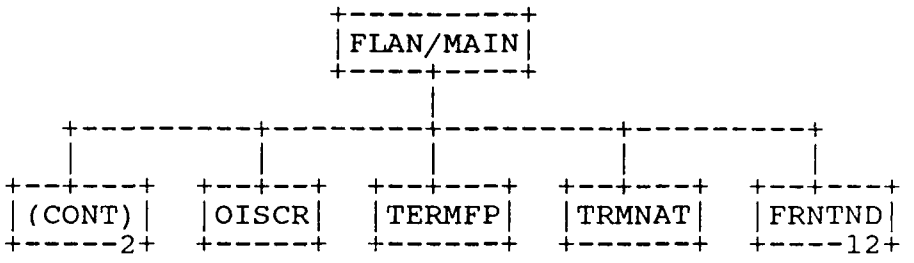
5


FLANCI
YYPARSE
DELFLD
PRINTF
STRUPC
STRNCPY
FREE
STRCAT
(CONT)
10

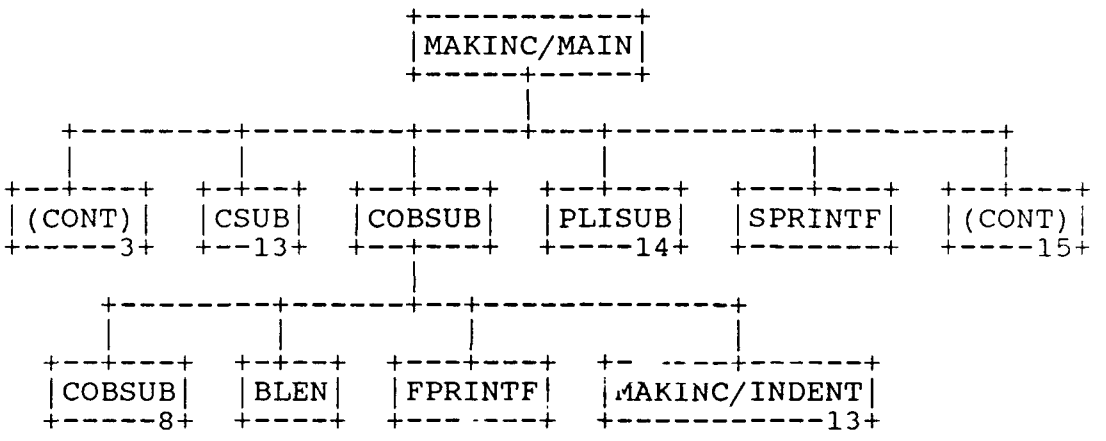
6


WRTFRM
SPRINTF
FOPEN
SYSMSG
FWRITE
FCLOSE
(CONT)
11

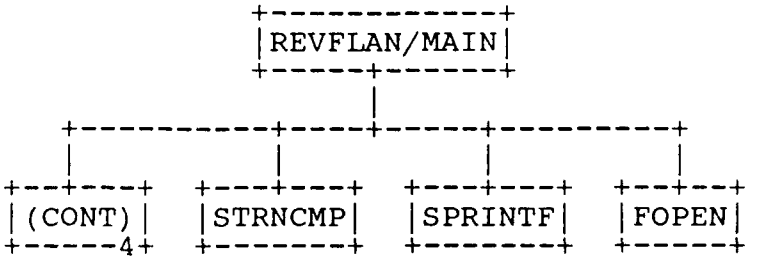
7


FLAN/MAIN
(CONT)
2
OISCR
TERMFP
TRMNAT
FRNTND
12

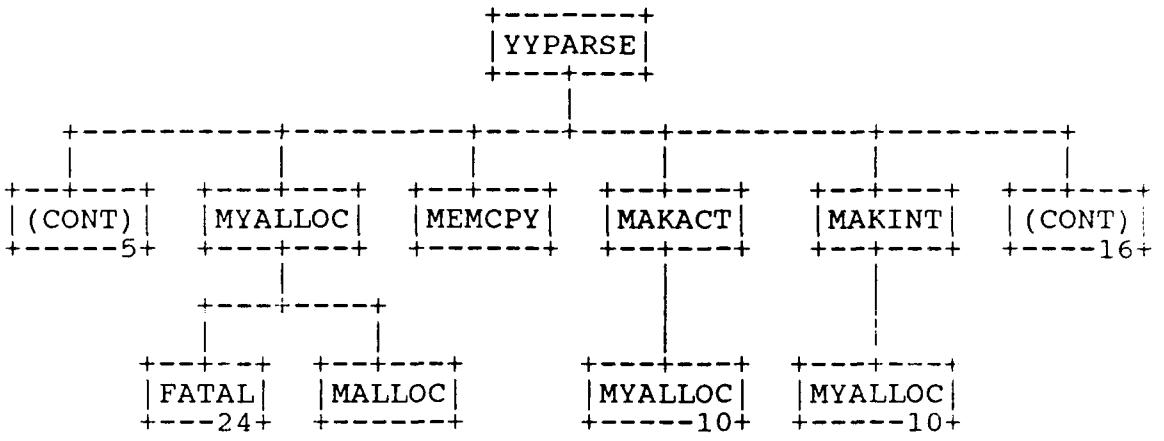
8


MAKINC/MAIN
(CONT)
3
CSUB
13
COBSUB
PLISUB
14
SPRINTF
(CONT)
15
COBSUB
8
BLEN
FPRINTF
MAKINC/INDENT
13

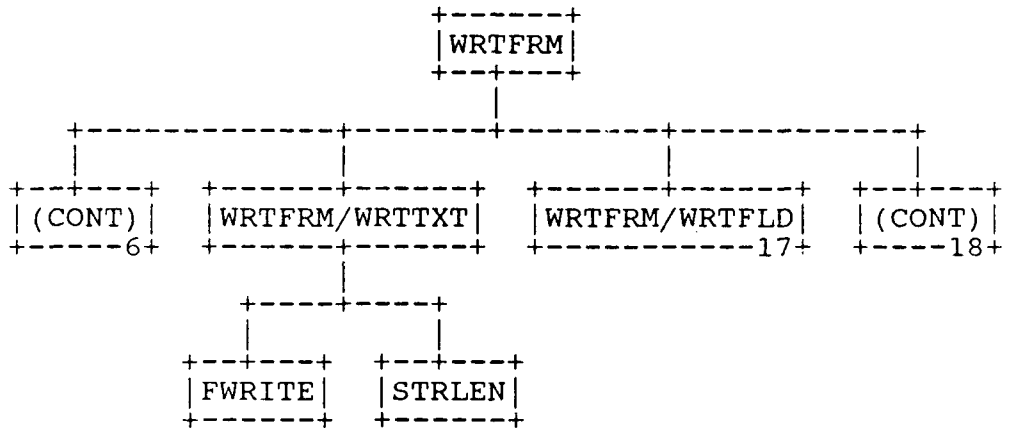
9


REVFLAN/MAIN
(CONT)
4
STRNCMP
SPRINTF
FOPEN

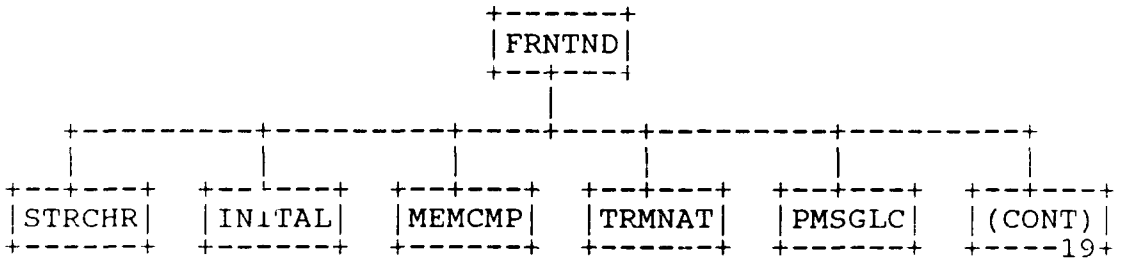
10


YYPARSE
(CONT)
5
MYALLOC
MEMCPY
MAKACT
MAKINT
(CONT)
16
FATAL
24
MALLOC
MYALLOC
10
MYALLOC
10

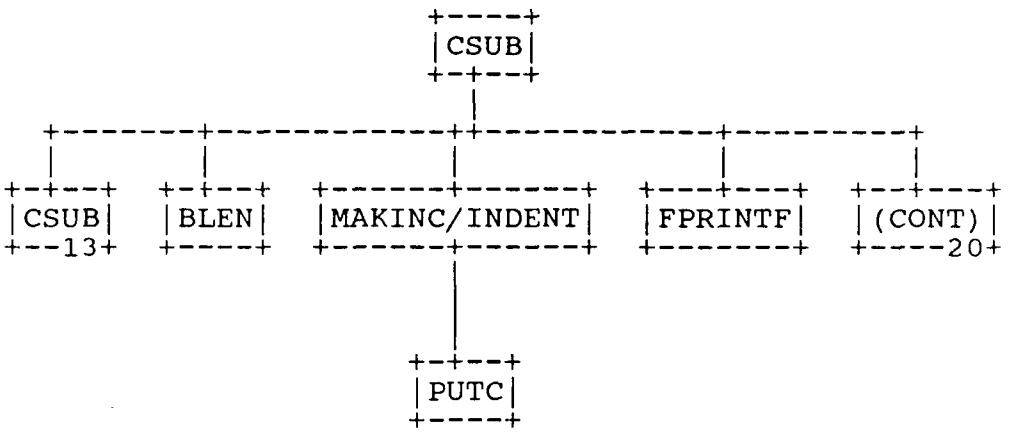
11


WRTFRM
(CONT)
6
WRTFRM/WRTTXT
WRTFRM/WRTFLD
17
(CONT)
18
FWRITE
STRLEN

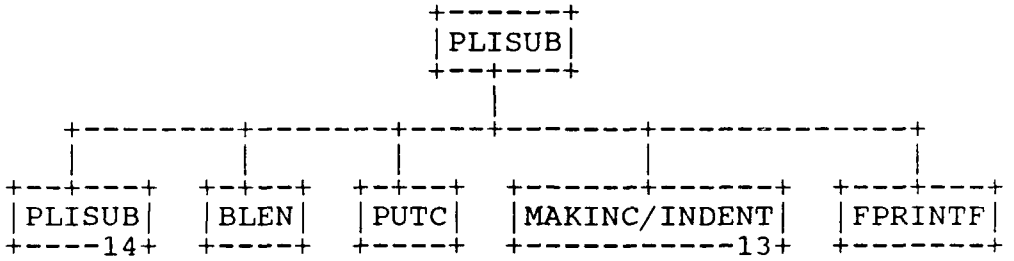
12


FRNTND
STRCHR
INITAL
MEMCMP
TRMNAT
PMSGLC
(CONT)
19

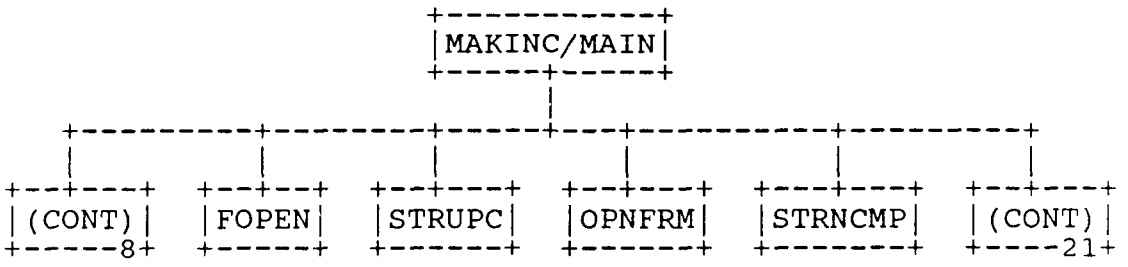
13


CSUB
CSUB
13
BLEN
MAKINC/INDENT
FPRINTF
(CONT)
20
PUTC

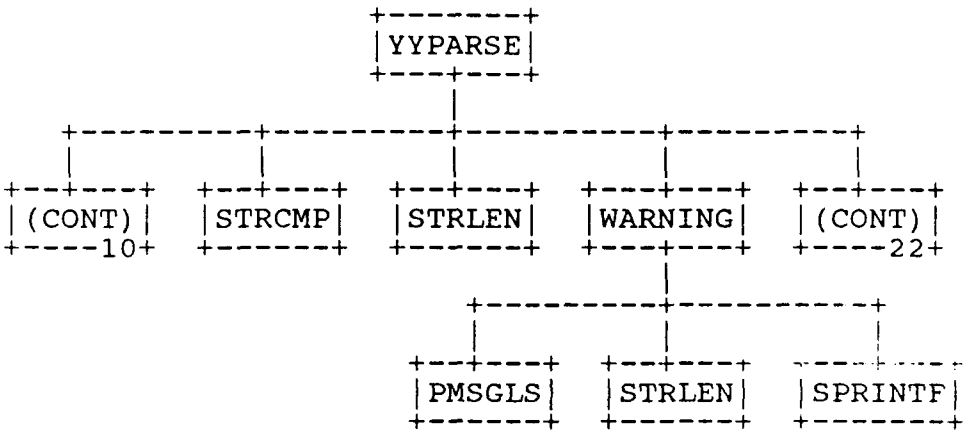
14


PLISUB
PLISUB
14
BLEN
PUTC
MAKINC/INDENT
13
FPRINTF

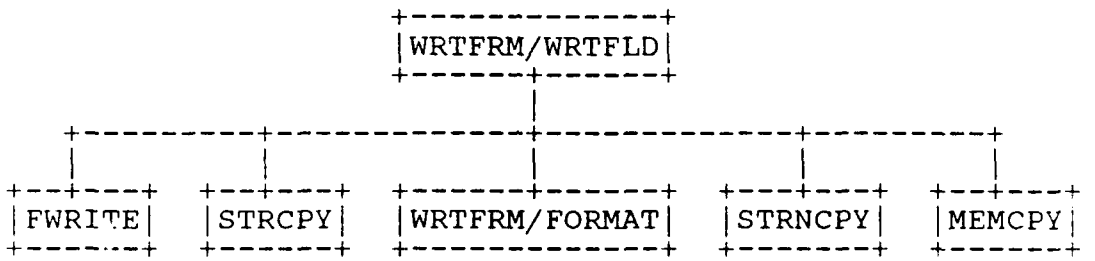
15


MAKINC/MAIN
(CONT)
8
FOPEN
STRUPC
OPNFRM
STRNCMP
(CONT)
21

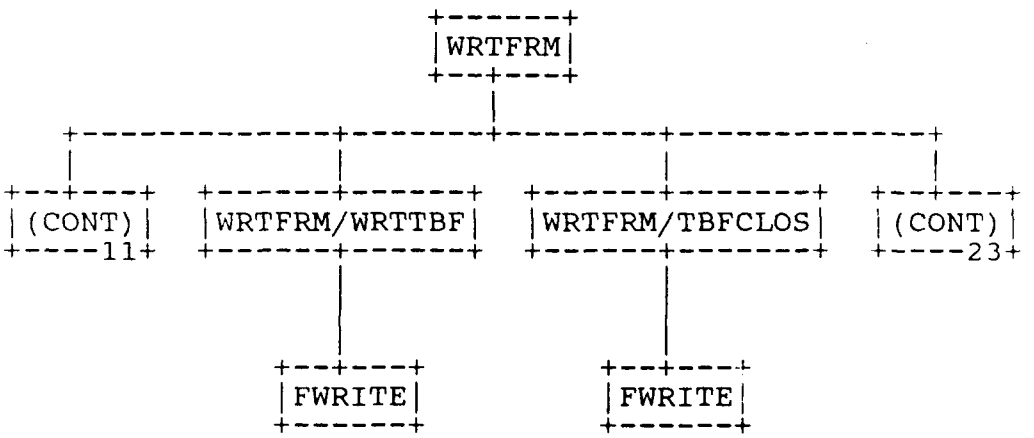
16


YYPARSE
(CONT)
10
STRCMP
STRLEN
WARNING
(CONT)
22
PMSGLS
STRLEN
SPRINTF

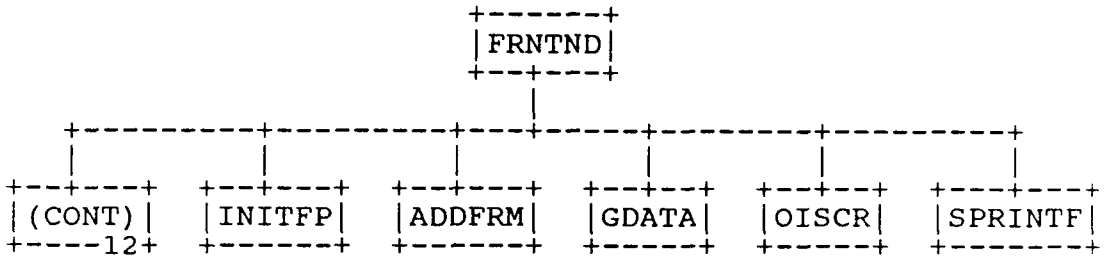
17


WRTFRM/WRTFLD
FWRITE
STRCPY
WRTFRM/FORMAT
STRNCPY
MEMCPY

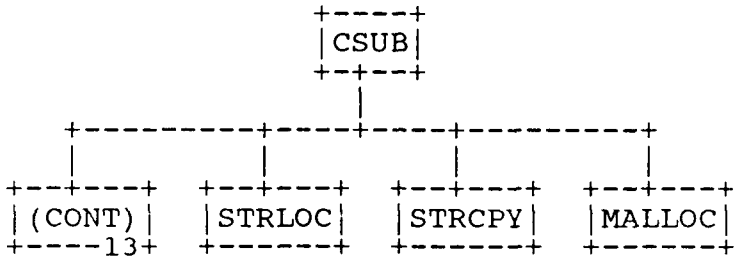
18


WRTFRM
(CONT)
11
WRTFRM/WRTTBF
WRTFRM/TBFCLOS
(CONT)
23
FWRITE
FWRITE

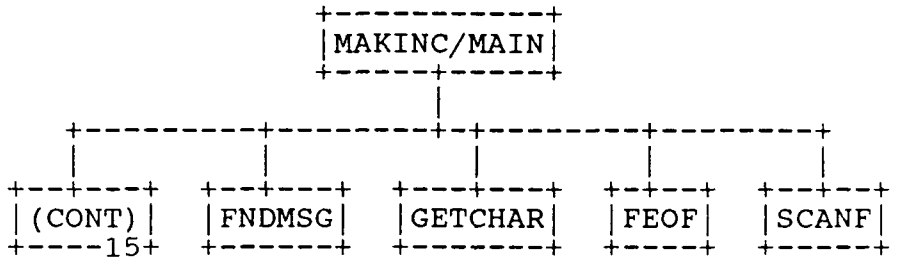
19


FRNTND
(CONT)
12
INITFP
ADDFRM
GDATA
OISCR
SPRINTF

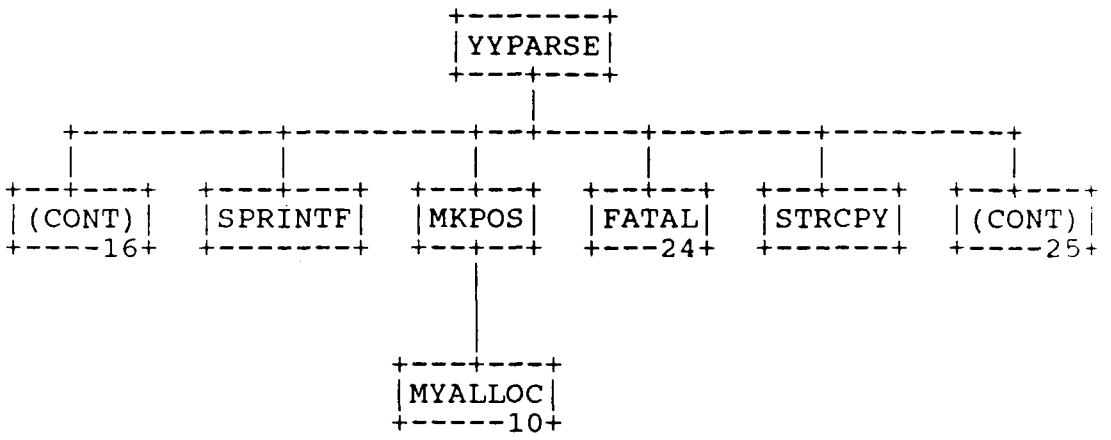
20


CSUB
(CONT)
13
STRLOC
STRCPY
MALLOC

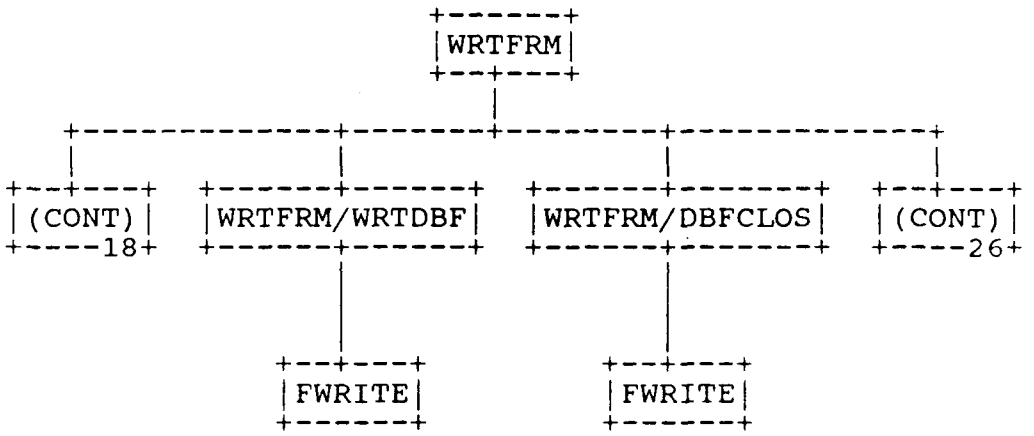
21


MAKINC/MAIN
(CONT)
15
FNDMSG
GETCHAR
FEOF
SCANF

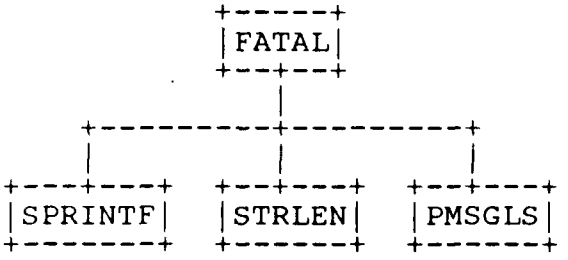
22


YYPARSE
(CONT)
16
SPRINTF
MKPOS
MYALLOC
10
FATAL
24
STRCPY
(CONT)
25

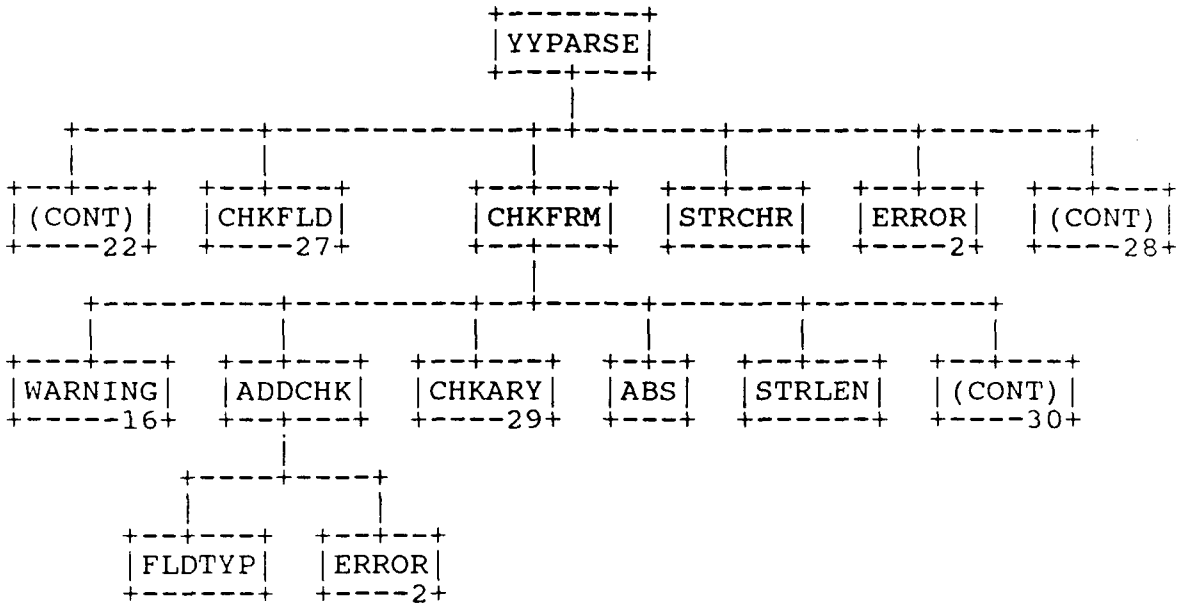
23


WRTFRM
(CONT)
18
WRTFRM/WRTDBF
FWRITE
WRTFRM/DBFCLOS
FWRITE
(CONT)
26

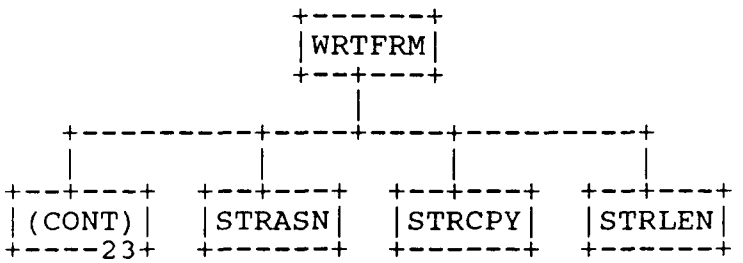
24


FATAL
SPRINTF
STRLEN
PMSGLS

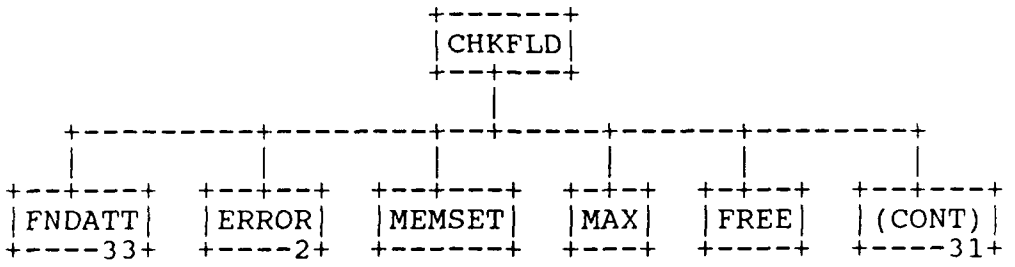
25


YYPARSE
(CONT)
22
CHKFLD
27
CHKFRM
STRCHR
ERROR
2
(CONT)
28
WARNING
16
ADDCHK
CHKARY
29
ABS
STRLEN
(CONT)
30
FLDTYP
ERROR
2

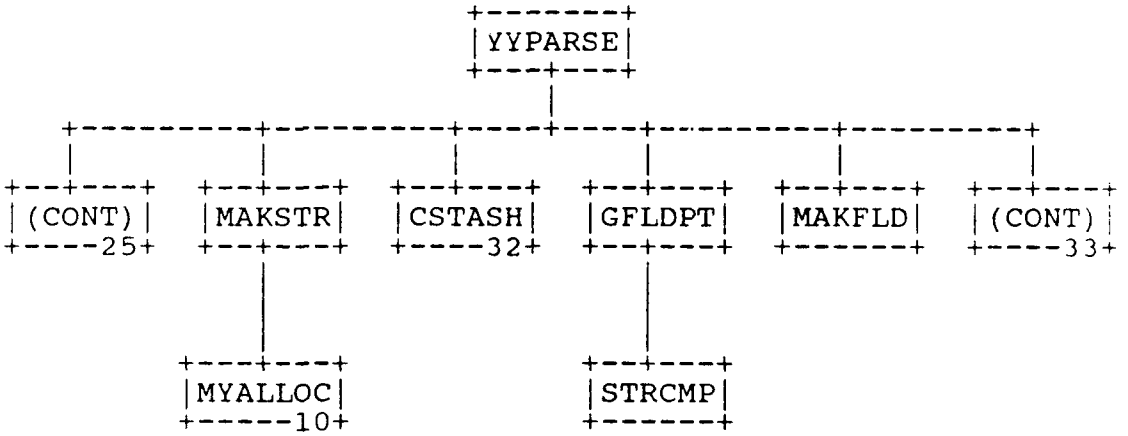
26


WRTFRM
(CONT)
23
STRASN
STRCPY
STRLEN

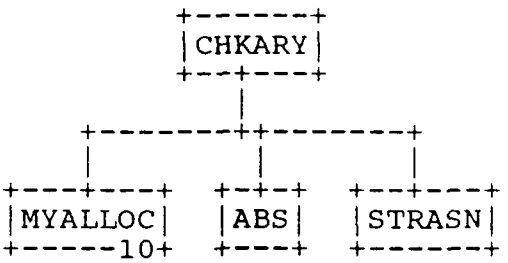
27


CHKFLD
FNDATT
33
ERROR
2
MEMSET
MAX
FREE
(CONT)
31

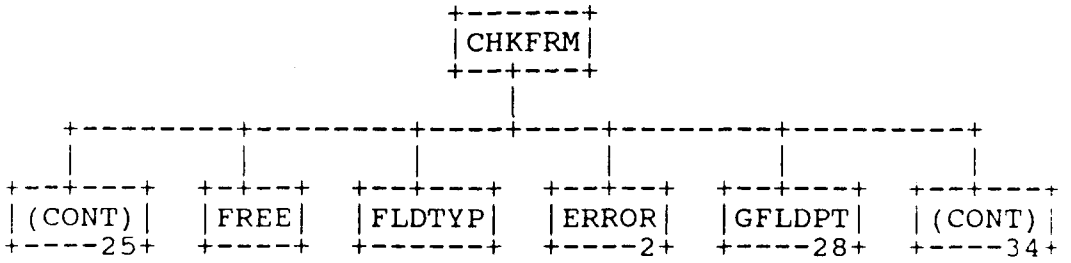
28


YYPARSE
(CONT)
25
MAKSTR
CSTASH
32
GFLDPT
MAKFLD
(CONT)
33
MYALLOC
10
STRCMP

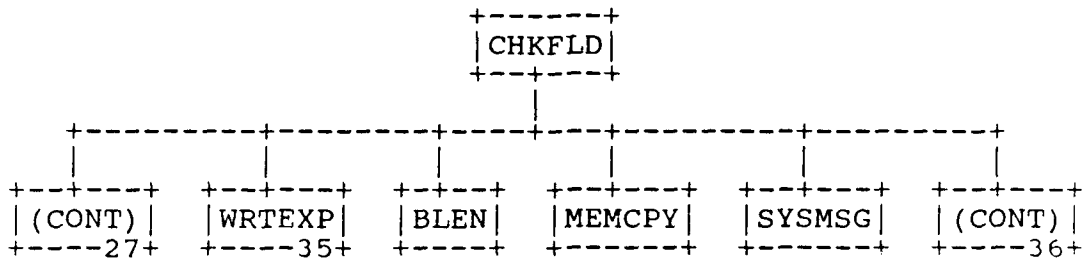
29


CHKARY
MYALLOC
10
ABS
STRASN

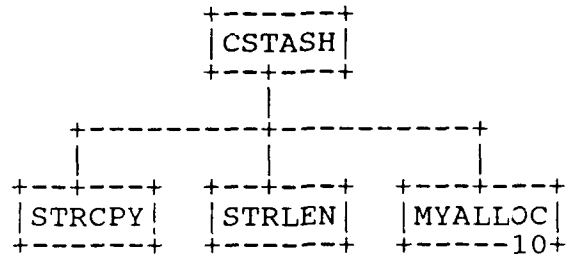
30


CHKFRM
(CONT)
25
FREE
FLDTYP
ERROR
2
GFLDPT
28
(CONT)
34

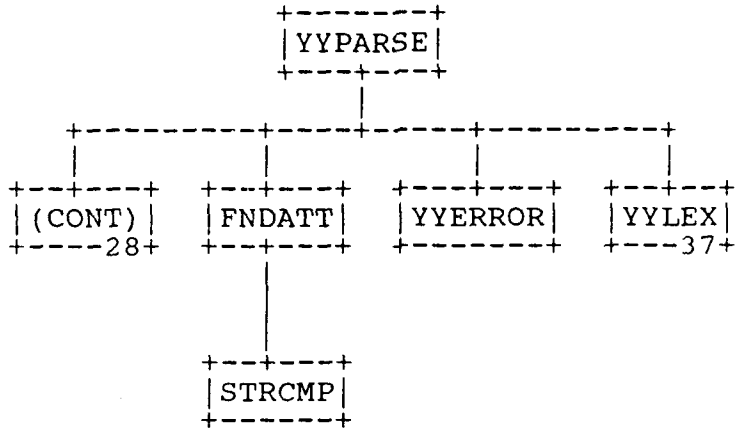
31


CHKFLD
(CONT)
27
WRTEXP
35
BLEN
MEMCPY
SYSMSG
(CONT)
36

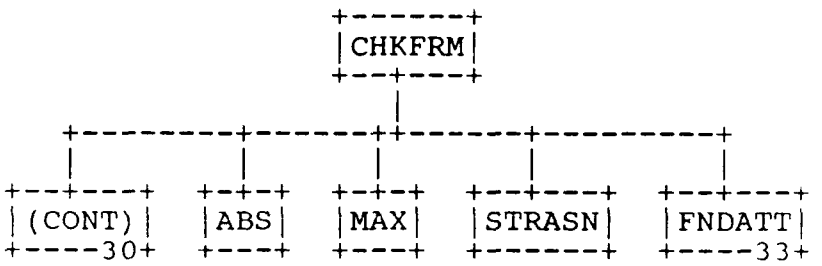
32


CSTASH
STRCPY
STRLEN
MYALLOC
10

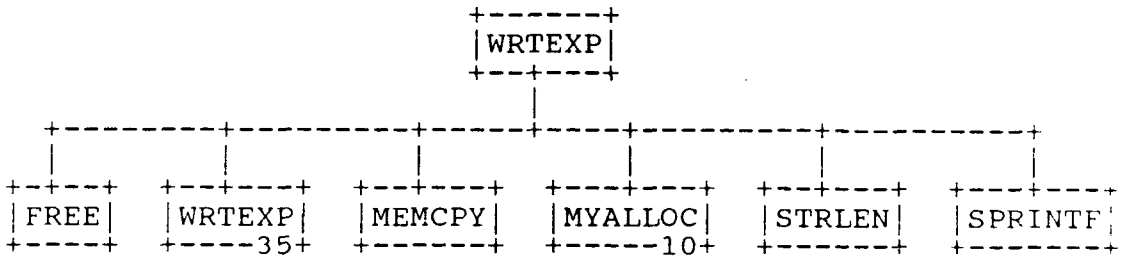
33


YYPARSE
(CONT)
28
FNDATT
YYERROR
YYLEX
37
STRCMP

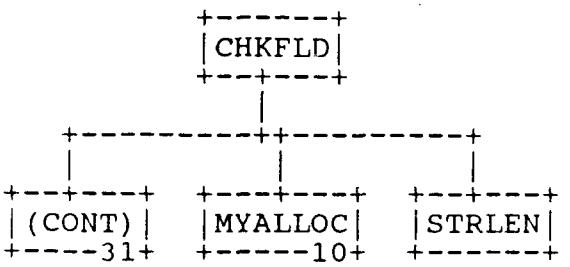
34


CHKFRM
(CONT)
30
ABS
MAX
STRASN
FNDATT
33

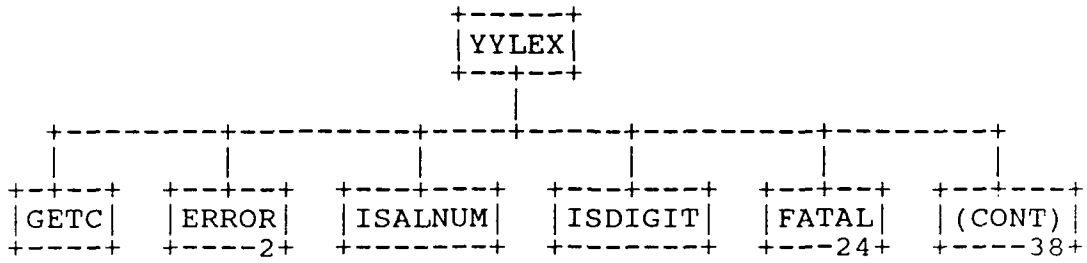
35


WRTEXP
FREE
WRTEXP
35
MEMCPY
MYALLOC
10
STRLEN
SPRINTF

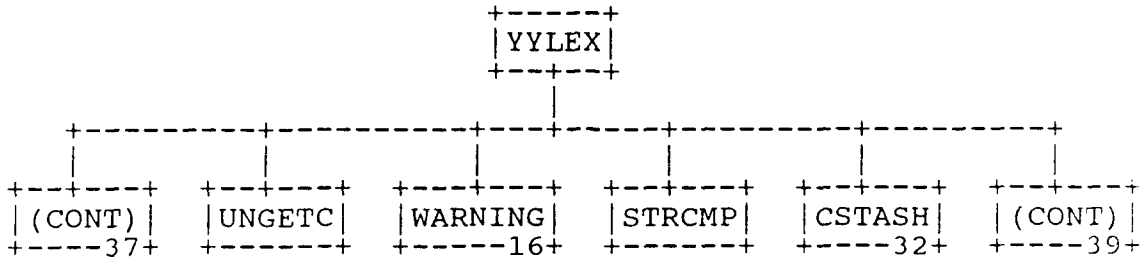
36


CHKFLD
(CONT)
31
MYALLOC
10
STRLEN

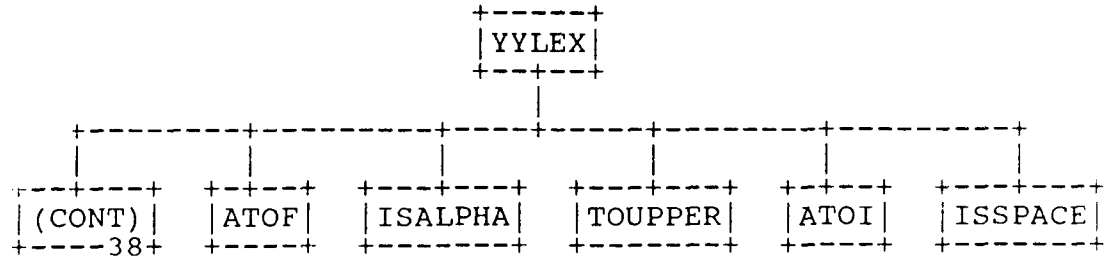
37


YYLEX
GETC
ERROR
2
ISALNUM
ISDIGIT
FATAL
24
(CONT)
38

38


YYLEX
(CONT)
37
UNGETC
WARNING
16
STRCMP
CSTASH
32
(CONT)
39

39


YYLEX
(CONT)
38
ATOF
ISALPHA
TOUPPER
ATOI
ISSPACE

3.11 Program Listings Comments

This information is contained in the Module Descriptions in section 3.10.

SECTION 4

QUALITY ASSURANCE PROVISIONS

4.1 Introduction and Definitions

"Testing" is a systematic process that may be preplanned and explicitly stated. Test techniques and procedures may be defined in advance, and a sequence of test steps may be specified. "Debugging" is the process of isolation and correction of the cause of an error.

"Antibugging" is defined as the philosophy of writing programs in such a way as to make bugs less likely to occur and when they do occur, to make them more noticeable to the programmer and the user. In other words, as much error checking as is practical and possible in each routine should be performed.

4.2 Computer Programming Test and Evaluation

The quality assurance provisions for test consists of the normal testing techniques that are accomplished during the construction process. They consist of design and code walk-throughs, unit testing, and integration testing. These tests are performed by the design team. Structured design, design walk-through and the incorporation of "antibugging" facilitate this testing by exposing and addressing problem areas before they become coded "bugs."